TECHNOLOGY DEPT.

September 1958

THE NAVAL
AVIATION
SAFETY
REVIEW

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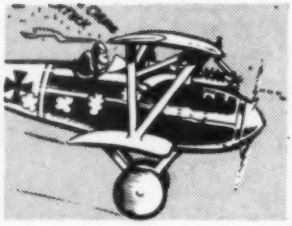

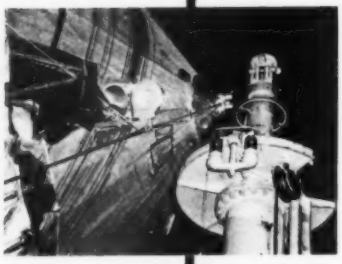

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RADM Allen Smith, Jr.
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CDR Herman Evans, Jr.
Head, Literature Department

Editor, A. B. Young, Jr. **Managing Editor,** LCDR W. J. Thomas
Art Director, R. A. Genders
Associate Editors: CDR J. A. Scholes; J. T. LeBarron, JOC; J. C. Kiriluk, Julia Bristow
Illustrator: R. B. Trotter; **Production:** C. A. Coe
Photographer: J. E. Williams, Ph 1

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LETTERS

Tape Stock Nos.

Sir:

Please list the stock numbers of reflectorized tape mentioned in June APPROACH which refers to BuAer Notice 11320 of 20 August 1957.

I understand BuAer Notices in this series are cancelled after about 6 months.

ASO, OCEANA

Green	*DS–8305–558–216*
Yellow	*DS–8305–558–0217*
White	*DS–8305–558–0218*
Orange	*DS–8305–558–0219*

Your understanding is correct.

Be Prepared

Sir:

Just two months ago 100 pilots went through the survival exercise called Operation Tenderfoot in the woods of North Carolina. This is a rugged one and my suggestion is that if you get orders to the next one (September 17, 1958), you had better be prepared. If you are not in shape it behooves you to do something about it right away. Talk to your flight surgeon and get the scoop about how much water and how many salt tablets to take on very hot days while performing a lot of exercise.

You've got to have your footgear in good shape because you'll be doing a great deal of walking. There are ticks and chiggers and snakes. The temperature runs in the nineties. If you are not in good shape when you arrive and if you don't heed this advice you'll learn but you'll learn the hard way. This training is the toughest one so far. I know . . . I was there.

FRANK J. DRACOS, LT, MC
Flight Surgeon attached to
Operation Tenderfoot
VR(F)–31, NAS, Norfolk

Watch for "Sugarpop"

Sympathizer

Sir:

Let me add my support and sympathy to COFFEE MAKER—

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From the time the Navigation Phase began at Hutch until I made my next landing in a P2V 18 months elapsed. You report into a squadron just following its return from deployment. Flying is at a minimum; nearly everyone has gone on leave; flights are scheduled on request.

If you can round up a qualified pilot and a plane this is the best time to get some "seat time." After the leave period you might as well forget it. In comes the flood of new officers; CDRs and LCDRs fresh from two or three years behind a desk. These are the prospective PPCs, and man, what they want is training in type. In the right seat is the second-tour LTJG who is keeping the whole operation *reasonably safe.*

Mining, gunnery, ship rigging, ASW, the ORI and then deployment. When the deployment draws near the end a staggering thought strikes the Operations Department —who will check out the next batch of CDRs and LCDRs and keep things safe during the training cycle? And the man at the nav table finally has his day. The frenzied check-out is aided by the fact that he has been looking over the plane captain's shoulder for over a year. Of course in the meantime proficiency has dropped considerably.

Every squadron has a training syllabus. Use it! The JO is eager to be trained. It is only the apathy and disinterest of the PPCs and the Training Officers that keeps these young pilots from getting qualified. COs don't escape the blame either.

LT. VP PILOT

Flight Foragers

Sir:

Re: proficiency flying. I had intended to keep my bugle muted until "pinked" by "Coffee Maker's" letter in the June issue.

I still maintain that as much proficiency time as possible should be maintained in operational type aircraft and these aircraft should be made available (perhaps by locally based squadrons) to proficiency pilots.

However—much of the proficiency flight time battle rests squarely on the shoulders of the proficiency pilot. If he sits at his desk from 0800 to 1600 waiting for a flight to be presented to him, that is where he will be left. A really "professional" naval aviator will go out and root for operational flights instead of crying in his coffee maker. He will be willing to fly outside of working hours in order to get proficiency time in operational aircraft. He will canvas the area looking for an operational plane to be made available to him or to find an empty seat in one that is scheduled to fly by another activity. This calls for extra work on the proficiency pilot's part for he must prepare himself on his own time by boning up on flight manuals and getting time in operational flight trainers.

So—to "Coffee Maker" I can only say—"Seek and ye shall find."

B. E. COLKITT, JR.
Commander, USN
(Still flying jets)

Can we compare the foraging power of a CDR to an Ensign? And while there are places "good" time can be foraged, there are also those where it can't. Perhaps the entire subject of facilities and requirements for proficiency training could stand a realistic evalution from both angles.

1. Is the average aviator making the most of what is available?

2. How far can the services afford to go in providing realistic airframes and programs geared to today's and tomorrow's proficiency and refresher problems?

Final Run

Sir:

Will the next time you roll in on a target for a dive bombing, rocket or strafing run be your last? I'm glad to see that Walter Mitty smile on your face. It reflects confidence in your ability and just a trace of scorn that anyone could imagine you boresighting a target.

While you are still smirking reflect for a minute. How many times in the last year have you read in an accident summary that a pilot dived into a target?

An examination of the records of these pilots reveals many interesting facts. In two of the accidents I knew the pilots. They were excellent aviators. They had "Tiger Blood," a much prized attribute in any pilot. They were aggressive and noted for their zeal in performing any mission. They were, in short, men you would be proud to serve with. However, each made that final bullseye with his plane.

Why? Obviously there are many factors that influence each individual accident, but in most instances a look at the pilot's past performance points the way toward that final low pullout or crash on target. In many cases the pilot was warned not once, but repeatedly, about making low pullouts! I'd be lying if I said I had never made a low pullout. Probably most of you can recall that chilling moment in a dive when you weren't sure you would make it out. Luckily we did.

What causes a low pullout? A strong tailwind? Perhaps a crosswind delayed putting the pipper on the target? Or perhaps you realized that amazing fact that by going lower, releasing lower, and pulling out later you got more hits?

Gents why in H_____ do you think anyone bothered to set minimum altitudes for release and pullout? Do you honestly think they don't know you can get better hits if you release lower and pullout later? You are 100 percent right! When they made the pattern they knew all the odds.

If you are making a run in which you can't release at the proper point then forget about dropping! Commence your pullout and compute corrections to enable you to release at the proper altitude and get a hit on the next run.

Play this game by the rules and you will be in there for tomorrow's game. Play by your own rules and today's game may be your last.

J. W. LAZZO
CAPT (R), VMAT-20

APPROACH welcomes letters from its readers. All letters should be signed though names will be withheld on request. Address: APPROACH Editor, U. S. Naval Aviation Safety Center, NAS Norfolk, Va. Views expressed are those of the writers and do not imply endorsement by NASC.

IN THIS ISSUE

look out for me!

YES SIR, fellow aviator, that's the pitch—you look out for me and I'll look out for you, and between us we'll share the air without trying to occupy the same chunk of it at one time.

Who's talking? Just me; I'm a fighter pilot—ex-VA, VP, VR and even had a short tour in helicopters. My VP time was with the Black Cats, and just to round off the log book I spent a month or two in poopy bags at Lakehurst. And mister, after looking out from all those varieties of aircraft I'll take my bubble-canopied pigeon any time. Why, for the first time since Primary I can really SEE all around me!

That's what I can't understand about the public reaction to jets. They've taken the word "jet" and just through common usage have made it synonymous with "mad, screaming, dashing, hell-for-get-there"; they've made "jet" to "airplane" as "hot rod" is to "automobile." And yet the modern jet fighter or attack plane is designed with good visibility as one of its criteria. It sure looks to me like we jet pilots have had a tin can tied to our tail just because we sit in front of a turbine engine instead of behind a recip.

I said earlier that I'm glad to get into a cockpit

. . . You'd be amazed at how many of our mid-air collisions occur on flights like this—smooth, CAVU, VFR day, a crossunder, and whammo. . .

that I can *see* out of, and that's where I want to stay. I don't think any VP or VR people will contest that point with me at all, no matter how much they like having umpteen radios and coffee on tap. As for the 'copters, I've had rotor pilots tell me that their low speed and fairly good cockpit visibility made them pretty invulnerable to mid-air collisions. Not so, not so, say I. And the statistics bear me out, with 14 helicopter mid-air collisions since mid-1952. Not many? More than enough, considering the number of 'copters in service. Slow? Heck, I've seen turtles collide on the beach; high speeds aren't the big worry in mid-air collisions. The helicopter's exposure to mid-air collisions is actually greater than that of fixed-wing aircraft when you consider that it operates in an area that *every* other aircraft must pass through. It's among the military and civil light planes, the high-flyers climbing out, and other helicopters. No sir, there's no place for complacency about collisions by helicopter pilots.

Me, I can look all around me just by swivelling the old dome, and after a look-see all around and straight up, I can do a quick half-roll and see everything below that I couldn't see before. And don't you think I don't often clear myself that way, cause I do! I'd be silly not to, in a plane that's made to maneuver the way mine is.

And yet there continue to be mid-air collisions between associated good-visibility VF and VA aircraft. They far outnumber the disassociated ones—87 percent of the 300-odd mid-air collisions since mid-1952 were between aircraft which were operating together in some phase of tactics or formation flying.

The 13 percent which involved disassociated aircraft certainly deserves just as much attention and effort, for it includes the collisions with private and com-

mercial planes (there were four such accidents in the 13 percent; the remainder were with other military aircraft) and with military passenger-carrying aircraft.

None of the 302 mid-air collisions was deliberate; in every case the aircraft collided because they couldn't avoid each other in time, or because they didn't see each other in time—either because they couldn't or because they *didn't*. (Well, there was the one case in which a young pilot tried to nudge his wingmate's wheel well door open with his wingtip).

While the collisions between disassociated aircraft are getting a full share of attention, both in accident prevention circles and in the press, I want to emphasize that the collisions in formation and tactics certainly are over-abundant. I wonder if the greatest number of those wasn't caused by failure to adhere to doctrine and SOP?

There you are, bumbling along in the blue or grey, with some other squadron mates, you start a turn, wingman starts to slide across, and ka-THUMP!—did he slide into you, or you into him? No matter right now—down with the curtain, kaSWOOSH, and out you are, and another mid-air collision is chalked up.

Why? Each of you knew the other was there, you were VFR, 'way up high with no mountains to dodge, canopies clear, you could see all around, and yet you collided—why?

Not sure of your aircraft? Over-confident of your aircraft, or of yourself? Not enough sleep last night, feeling kinda rusty today? Or maybe this section leader flies just a bit differently. Whatever the cause, you can be pretty sure of one thing—nobody pushed you. Like the story about the jealous contemporary who once told Napoleon that it was easy to see why he won all of his battles, circumstances always favored him. Nappy's reply was, "I make the circumstances."

We've all heard that old excuse for an aircraft accident—"I couldn't avoid it under the circumstances." And unfortunately, the statement is very often correct. *The circumstances, therefore, must be controlled if we are to avoid accidents.* And this goes for mid-air collisions.

What are the circumstances that are under the pilot's control? Not all of them certainly, for he knows the best way to avoid a collision is to ground everyone else but him, but the Boss won't go along with that.

Visibility. Does this tactical flight have to head right into that setting sun? Did you insist that the windshield be thoroughly cleaned before taxiing out? You have a tinted visor but it's jammed? Rolling over or making a clearing turn is old-fashioned? Depending on HIM to see you first? Dark adaptation is for night fighters only?

Planning. This flight could have been routed to avoid those high-density areas. Do you HAVE to work out those cruise settings while the co-pilot is thumbing through the RadFacs? Seems like lots of that could have been done back in the air-conditioned flight planning room. More thorough flight planning on the deck means less head-in-cockpit up in the blue. Looking for the approach plate NOW?—could have slipped a pencil, piece of paper or anything at the right place back there in flight planning. Mark of a professional aviator.

Increased use of IFR clearance imposes severe burdens upon already burned air traffic control system.

Utilization of personnel. What's the jaygee doing back there at the radio table—reading APPROACH? Here, let him work out these cruise figures so you can look outside. Or have him look out while you do them if he's useless for paperwork. Plane captain has a wife and three kids too—he shouldn't need much convincing to prop up there on the jump seat and make like a sentry. And those patrol plane crewmen and trainees—how about posting a couple of lookouts—with phones on and mike in hand? Make them aware of what they're doing and why. They'll do a better job if they are relieved every half

hour or so, with a pat on the back for good spotting. Are you satisfied that your limited forward visibility is all that's needed? You've got a man up in the nose? Good—how about giving him a gig for not reporting that *Connie* that climbed right up in front of you? He assumes you saw it—but we know better, don't we? Luckily I was up here looking over your shoulder at the time.

Speaking of being up here, what's your outfit's policy about letting passengers come forward and stand around asking what's this? Oh sure, there's published rules about it, but do you follow 'em? Only break the rule for VIPs, eh? Well, it does get a mite delicate, 'tis true, but you can control the circumstances under which you get visited by at least making sure that only one of you is diverting your attention to the VIP. And if the visit becomes too distracting, have you tried getting on the mike and talking to anyone, like Stargazer or an ocean station ship? Works.

Communications. Both external and pilot-to-copilot type. You can learn a lot sometimes about who's in the same chunk of sky if you'll just *not* push down all those switches. Big help too, when you hear someone report Horner's Corners on the hour at 8000, and there YOU are at HC, on the hour, at 8, makes you look around real careful like.

And for gosh sakes, communicate with that warm body in the right seat, will you? If you see an aircraft that's converging from far out, let him know NOW, so he won't wrap it up into a split-S when he suddenly does see it. If it's on his side, make him know that you expect him to eyeball it until you're safely by. And if it's on your side—well . . .

Equipment. Don't you often wish you had one of those flashing red police cars beacons on your Jaguar? Satisfy that urge, and flip it on every time you aviate—it has the same effect as the Highway Patrol's, it lets people know you're there and makes them more alert. Converging with someone at night and you think he doesn't see you? Maybe a flash or two of your landing lights will gently remind him that you're there. Flying over a city at night in good VFR weather is so relaxing—all those nice lights down there, but it's one of the worst situations for seeing another aircraft's lights. A P2V and a C-118 collided over a California city under conditions like that. Some airborne search radars are capable of limited help; interference on the scope often means that another radar on the same band is operating in the vicinity.

Adherence to Instructions, doctrine and SOP. Do you? Rules are promulgated for a purpose, including rules to minimize the possibility of mid-air collisions. The recent instructions regarding the use of instrument hoods, crossing or entering positive control airways, IFR point-to-point flights at certain altitudes, are intended to provide for greater air safety. Needless to say, adherence to flight plans and clearances, and prompt, accurate position reports also provide for greater air safety.

Head unlocked and swivelling. Whether you be alone under a bubble canopy or jointly occupying a big radio-studded cockpit with peepholes out the front, swivelling the head in all useable directions is still a very basic and useful form of anti-collision insurance. The other guy can have a zillion flashing red lights going, but they're not going to do either of you any good if you're not *looking out* for them.

There are some areas beyond the control of the individual pilot that could contribute to prevention of mid-air collisions. Most of them already do, to varying degrees, but while you're thinking of things you can do, let me sound off a few things that others can do.

Training. Here's a real fertile spot for doing some good work. Training of crews in team concept,—"you look out while I write, and I look out while you scribble." Training of aircrewmen to be conscious of how much they can contribute to air safety by Looking Out—Looking Out For You, for Me, and for themselves. Training crewmen to recognize a potential collision situation when bearings remain constant.

Aircraft Marking. Now that the training aircraft are decked out in easy-to-see orange, it's beginning to catch on in other areas. Some AJs have been observed with orange tiptanks and tails, and a few weeks ago I saw an S2F at Jax which stood out like a carrot in a bowl of peas; it was painted a livid fluorescent red-orange that just screamed to be seen. The CAA has adopted a high visibility orange for all its 92 aircraft and the USAF is expected to be painting about 13,000 of its birds in orange soon and I wonder whether it isn't time for just about all our aircraft except those deployed to the Sixth and Seventh fleets to dress up in some bright, seeable colors.

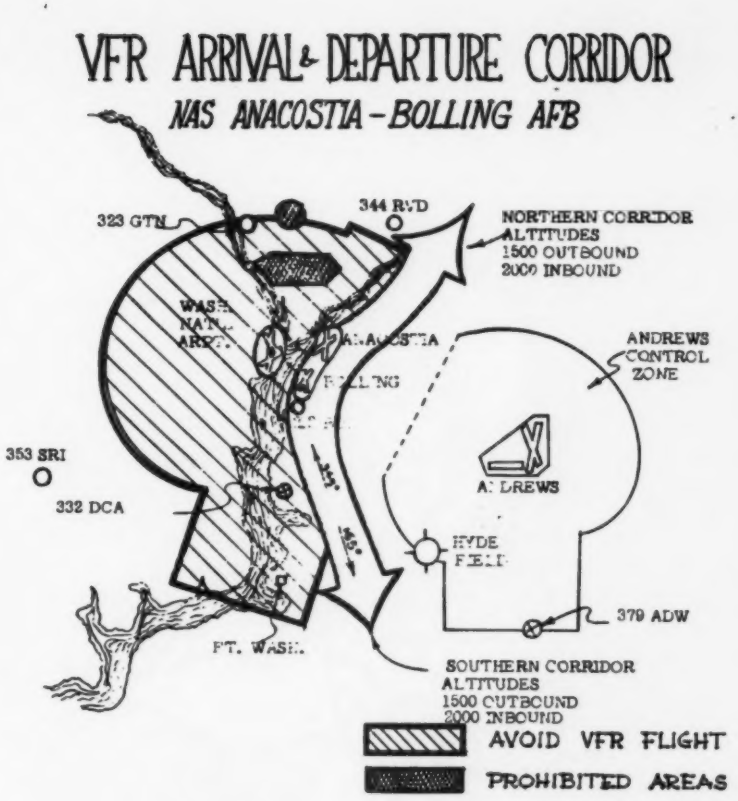
Not only would this contribute to the seeability between disassociated aircraft, but it might also help the VA/VF boys in formations—flying wing on a gray ghost airplane in a gray ghost sky just doesn't seem to offer the best in collision prevention. There are high visibility paints on the market now, which are supposed to last about 6 months and be easily removable—(wouldn't you turn to with a spray gun if someone left a gallon lying around?)

Ground Control. Folks on the deck are often helpful in com-

municating potential mid-air collision danger too. With the ever-increasing use of radar in air traffic control and monitoring, we're getting closer—at least in positive control areas—to the day when someone in a black booth can see a converging situation long before you are aware there's someone else in the air. GCA people have been giving such advance warnings for years. Tower controllers can often see aircraft converging, from a vantage point that neither pilot has. But the aid they can offer doesn't entitle us to relax our vigilance one bit though, for they have other things to watch to.

Education. There's one area that hasn't been tapped nearly as thoroughly as it should, although I've seen some examples of real constructive effort, and that's the exchange of word between military and private pilots and their air facilities. For example—most private pilots are accustomed to traffic patterns at around 600-800 feet, and they're accustomed to the heavier, faster commercial traffic using 1000-1200 feet, so they look upon 2000 as a reasonably safe altitude to overfly a field. How many of them know that quite a few military fields have formations of jets breaking at 2000 overhead? Not too many, I'd wager. And how many private pilots and fields know the corridors normally used by nearby military fields under VFR conditions? Not too many, I'd wager.

What to do? Why not do what CO, NAS Los Alamitos did; he sent out a friendly letter to all local private pilots, aircraft owners, airport managers, and flying clubs, telling them how his field operates—what corridors and altitudes they normally use and why, and asked them, in the interest of aviation safety, to use extreme caution when operating in or near those areas, especially on weekends when his traffic is swelled by



Some areas have published VFR procedures for use of transient pilots and for information of local pilots.

Reserve operations and the private aircraft are also aloft in increased numbers.

Communities. Wonder what effect an aggressive industrial smoke campaign would have on mid-air collisions? This was clued by a pilot who reported 3-4 mile visibility up to 9000 feet over a large city, the industrial smoke and haze hung over the city like a shroud. And since industrial cities are often coincident with high density flight areas, a reduction in smoke-smog-haze—call it what you will, would enable *me* to see *you* sooner.

If all the areas I've mentioned were exploited to their utmost, I'd bet a jug or two that we'd see a significant decrease in the number of mid-air crackups.

No bet though, because we'll always have a Dilbert or two with caged head & eyeballs, which means you and I can never, *never* relax our vigilance. It's about like what they say about that dangerous practice of driving autos on highways, you gotta drive like every other driver is an idiot.

Another? Okay—here's to bigger and better bubble canopies on all transports and P-boats! And don't forget to Look Out For Me as I look out for you! ●

HOT P

FINE barbecue. Real fine. Good chicken, good beer. You're sitting there contentedly chomping away at an ear of roast corn when friend host, at the grill, pulls a hot baked potato out of the coals and shouts, "Think fast", as he lobs it at you.

Some practical joker type hosts have been known to disappear after gags like that, but let's let him have his fun and see what goes on in your mind right after the spud becomes airborne.

If one were to analyze and reduce to slow-motion all the things that went on in your body and brain in the two seconds or so after spudnick was launched there'd be enough calculated observations to fill a HMI. Just think of the split-second mental and physical gymnastic

POTATO

you go through, without even being consciously aware that you've done much of it—"What's he doing?, what is it?, is it coming at me?, whaddo I do?,—duck, drop the corn and catch it, ignore the whole thing and later inquire if he carries personal liability, or throw the corn at him, sidestep the flying spud and then bust him in the bazooka?"

Your reactions to a relatively simple situation like that are going to determine whether or not you get beaned with a Hot Potato. And your reactions in flight are run by the same mental machinery, often with far more complex decisions and actions required, and sometimes with as little or less time available.

In a potential mid-air collision situation you can't catch the Hot Potato and heave it back before

Continued from preceding page

you get burned, you've got to dodge it. And that's where reaction time comes into the act.

Now, lest the reader regard himself as blessed with hair-trigger reactions which will extract him from any hairy situation he might encounter, leave us examine the problem. There's a tricky little matter of feet-per-second *vs.* time available which should interest you.

An airplane loping along at 460 knots is moving through the blue at some 770 feet-per-second, or roughly about two-thirds as fast as a bullet fired from a .45 caliber automatic. Should another airplane be coming, opposite course, at say 440 knots, there is a closing rate of about 900 knots. This is considerably faster than the muzzle velocity of a .45 slug, and considerably more lethal in character. Begin to see the possiblities? Let's try an example:

Put an A3D over Chicago's lake front; put him barreling south at about 440 knots. Now slide an FJ in someplace south of the Windy City, say over Cicero, and head him north at a 460-knot clip. Line up the two whistle-buggies on a collision course, and let's observe the problem which then confronts the gent in the cockpit.

It's a bee-utiful day in Chicago, and the pilot of the *Fury* spots the A3D at about three miles distance, and something like the following mental activity takes place in the Fury pilot's cranium:

"Um, 'nother airplane . . . going away . . . nope, coming toward me.

"Um, other pilot's probably got his head up and locked. Guess I'll bend her around to the uh, let's make it left, uh, right?

"Well, better turn some way . . . here we . . . YIPE! That x%# dang guy near plowed right into me!"

The remainder of this sizzling soliloquy contributes little to our story, so we avoid a hassle with the postal authorities and resume the discussion.

From the moment our driver first spied the other airplane a nasty, uncompromising factor called "time lag" stepped into the picture.

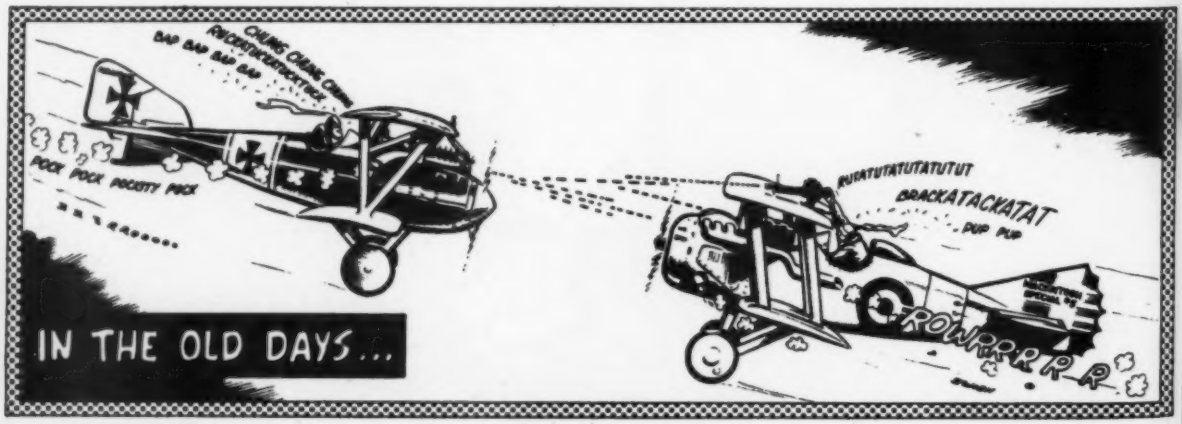
"Whut's thet?" you ask.

It means that it takes approximately ⅒ of a second for the nerves to carry to the brain what the eye sees, and it takes approximately ½ second for the brain to recognize what it sees. In turn, it takes approximately one second for the brain to make a decision when there are several choices. For instance, to decide whether to turn the plane up or down, right or left. It takes approximately ⅒ of a second for the nerves to carry that decision to the muscles and make them move.

To the pilot of the *Fury*, now closing at a combined rate of 1500 feet per second, it meant 150 feet used up in the ⅒ of a second for sight to reach the brain. It meant 750 feet consumed in the ½ second for recognition to take place. It meant 1500 feet in the one second spent in deciding a mid-air collision was imminent. And it meant 600 feet in the ⅒ of a second to react. All in all it meant about 3000 feet used up from the time the *Fury* saw the A3D until a reaction was *initiated*. Remember, the sighting had been made at 3 miles, about 16,000 feet, and considering that 3000 feet were used up in the mental processes noted earlier, there are now only 13,000 feet separating the two aircraft.

If our cousin in the *Fury* should continue to argue with himself as to which way to turn, say for about an additional four seconds of chit-chat, he would have consumed another 6000 feet, and we're down to less than 7000 feet separation remaining.

But *Fury* Fred has finally decided to turn right to avoid bashing noses, and he's starting the necessary action. Now again



that old debbil time lag gets into the act. This time it is not the lag inherent in the reaction of the pilot, but the time lag in the airplane itself.

You don't just bend several tons of flighting *Fury* around a corner the same way that Fangio or Moss take a turn in the *Mille Miglia;* it takes time for the bird to respond and overcome the inertia force that's tending to keep it headed right along a straight path. How much time elapses between pressure on the controls and a significant change in the flight path? It's hard to measure, but it's known to be more than a second—closer to two seconds. Some folks with slide rules even say five seconds. For this example, let's call it two seconds.

In this theoretical case there remained about 7000 feet of separation between the two aircraft. Fury Fred, closing at 1500 feet-per-second might have had time to get out of the way, with less than a mile to spare, but there are recorded instances where time ran out on the pilot. People can become disassembled that way.

"Missed by a mile," you say? Well, all the conditions stated above are *ideal* conditions; they assume that you see an aircraft the instant that it comes into the threshold of visibility, that you interpret the situation correctly, and that you react without pondering over the matter. If you have your hands full of chart, RadFac or REST computer, precious fractions of seconds are added.

The time it takes for a person to react is dependent upon his physical and mental condition too. Fatigue slows reaction time considerably. Anxiety, boredom or preoccupation can also have a bearing on reaction time.

Because it isn't at all necessary for you wanderers of the wind-ways to be unduly exposed to this sort of split-second decision making, allow us to insert a few notes on the cuffs of your coveralls:

In scanning the sky, short, regularly spaced eye movements are better than sweeping movements. The sweeping search gives the false impression that a large area of sky has been examined. (The same is true in reading—a good, fast reader reads during the very brief fixational pauses and not as though he were reading a continuous teletype strip.)

At night, the daylight-seeing cones in the retina of the eye are pretty insensitive, and give you a "blind spot" right where you're looking. If you detect an object, your chances of seeing it are better if you force yourself to look off to one side of it just a bit. This calls for a conscious effort (something like rubbing your head while patting your tummy) since it's instinctive to look directly toward an object that you want to see.

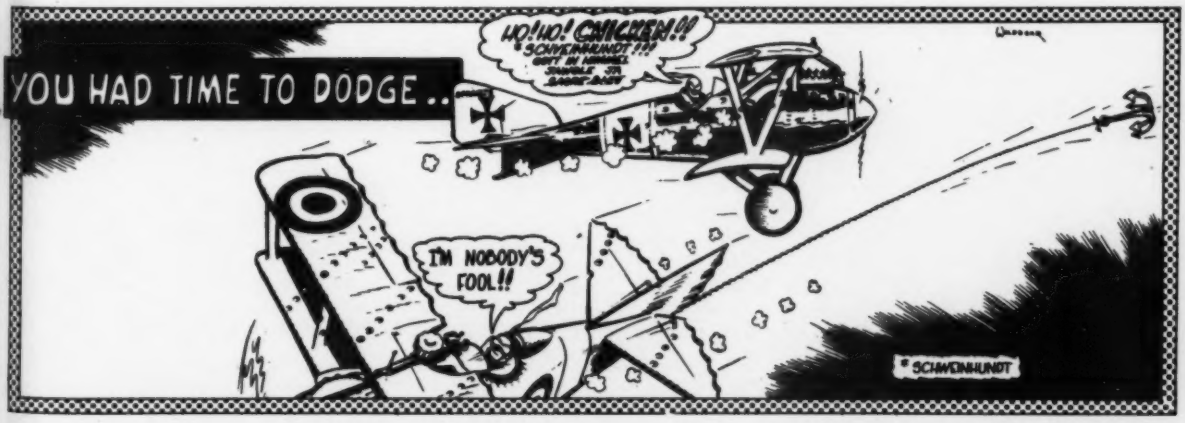
In any meeting or potential collision course situation, alter your course and/or altitude immediately to clear.

Apply the principles indicated above to aerial gunnery procedure and avoid pressing home your attack literally to the point of no return.

The airlines' concern for the growing threat of space-time-reaction is evidenced in the current development of a "Doppler radar" to provide adequate forewarning of the approach of other aircraft. And let it not be said that the military fly-boys are any less thoughtful of their health.

CAA is also test-flying a variable frequency flashing white wingtip light for transport use; the light will flash at different rates when seen from forward, abeam, and astern, and should provide the viewer with more clue as to the relative heading of the sighted aircraft. Note once again though, you've got to be *looking* out the window to see it.

Pending some all-seeing gadget to nudge you into action, be your own safety gadget, and don't allow a situation to develop. ●



1. If you desire an immediate change of altitude due to icing conditions, loss of power, etc., you must do what to get immediate action on such a request from ATC?

2. Approach control should be contacted prior to reaching a specific holding point. T or F.

3. Which of the following reports are always made to ATC? Which are made when requested by ATC?

(a) Time over range station or outer marker inbound or final approach.

(b) When an approach has been missed.

(c) Jet Aircraft report over final approach fix (low cone).

(d) Altitudes when climbing or descending.

(e) When vacating any altitude for a newly assigned altitude.

(f) Any other information which may aid in the control of air traffic.

(g) Time when reaching a newly assigned altitude.

(h) The time and altitude of reaching a holding point to which cleared.

(i) The time of leaving an assigned altitude.

(j) Time of starting procedure turn on final approach.

(k) When visual reference to the ground is established.

In the event of radio failure and you proceed on IFR flight:

4. You should always continue the flight at the minimum instrument altitude established for that portion of the route over which you are flying. T or F.

5. If you have received and acknowledged a clearance to a point other than the destination airport or radio facility serving the destination airport you should

6. If holding instruction has been received but no expected approach time has been received, follow the holding instructions until

7. If no expected approach time was received, start your descent over your destination radio facility at the _____

8. ATC will hold all altitudes below the clearance altitude open for you at the destination radio facility for 30 minutes after the filed ETA or last expected approach time acknowledged by you. True or False?

Answers on Page 48

Wheels-Up Saves

Total reported since Nov. 1956 296

WHEELS WATCH NOTE—Prior to commencing FCLP the F11F-1 pilot extended wheels, flaps and speed brakes to burn down to landing weight. The speed brake override switch was placed to the ON position to extend the brakes while the wheels were down. The speed brakes were retracted upon entrance to the FCLP pattern and two passes were conducted; speed brakes were observed to be up by LSO.

The pilot inadvertently hit the speed brake throttle switch some time during the 3rd pass which resulted in speed brakes coming down and making contact with the runway on touchdown. Squadron policy now includes a radio check for speed brake override switch to normal position prior to entrance to the FCLP pattern.

BOX SCORE

Wheels-up landing, unintentional, pilot induced

July 1957	3
July 1958	6
Total to date 1957	20
Total to date 1958	20

Name	Station	Acft	Date
LATIOLAIS, H., AN	NAAS Kingsville	AD	**
GEORGE, H. C., SA	NAAS Kingsville	S2F	**
McDOUGAL, A. J., ACT2	NAAS Kingsville	S2F	**
Sgt. R. L. FAY, USMC	NAAS Edenton	A4D-2	6/24/58
GLENN, C. R., ACT2	NAS Cecil	F9F-8	5/23/58
HAYES, W. M., AC1	NAS Cecil	F9F-8	5/27/58
HANNING, J. L., ACC	NAS Cecil	F4D-1	6/4/58
KUNZE, D. K., AC2	NAS So. Weymouth	AD5W	6/5/58
*CONWAY, A. R., AC2	NAS Moffett	S2F	6/5/58
BACKE, A. T., AL1, USCG	CGAS, Eliz. City	S2F	7/8/58
KAEMPF, M. L., Cpl.	NAAS Edenton	A4D-2	7/10/58
CALI, J. R., Cpl.	NAAS Edenton	A4D-2	7/11/58
ROBERTS, J. W., AD3	NAS Miramar	F9F-8	7/1/58
LLOYD, B. F., AN	NAS Whiting	T-28	6/2/58
GUNDELFINGER, G., AN	NAS Whiting	T-28	6/5/58
LITTLE, M., AE3	Bagdad (Whiting)	T34	6/6/58

* Two Previous Saves ** not reported

NEAR MISS? REPORT IT!

HAVE YOU JUST "MISSED" being involved in an air collision? Has another aircraft loomed up suddenly in front of you too close for comfort? Have you taken evasive action to maintain safe separation distance? If this, or a similar experience of another aircraft coming "too close for comfort," happens to you — then, PLEASE REPORT IT to the Civil Aeronautics Board.

The CAB "Near Collision" Report Program, endorsed in OpNav Inst. 3750.10, will provide factual data needed to develop facilities and programs for mid-air prevention.

Your cooperation is urgently requested. In the interest of reducing the potential of air collision, it is necessary that valid statistical data be obtained on the circumstances surrounding such occurrences. Your name or aircraft registration number is not needed. No attempt will be made to identify pilots or aircraft. These reports will be held in strict confidence by the CAB. They cannot be used for any action against either a pilot or an operator.

Please complete this questionnaire by checking off the pertinent items. Add additional comments and suggestions if you desire—then seal and drop the report in a convenient mail box. No stamp is required.

NOTE—This report does not replace any report which may be required by your own command. If such a report is required of you, or if you wish to report the incident for purposes of official action, then you should take whatever additional action is appropriate.

"NEAR-COLLISION" REPORT—Please check pertinent items and return to CAB

1. Incident occurred:

- ☐ Arriving or departing an airport **having** a control tower
- ☐ Arriving or departing an airport with **no** control tower
- ☐ En route

LOCATION _____

(If you wish, give exact location, otherwise, indicate the State in which incident occurred)

1a. ☐ In controlled airspace (airway, control zone, control area)
☐ Outside controlled airspace

2. Time:

- ☐ Dawn
- ☐ Daylight
- ☐ Twilight
- ☐ Night—dark
- ☐ Night—mo

3. Operating in accordance with:

- ☐ An IFR clearance
- ☐ An IFR clearance, with a VFR restriction
- ☐ VFR—in contr
- ☐ VFR

4. Navigating by means of:

- ☐ L/MF range
- ☐ ILS
- ☐ VOR
- ☐ GCA
- ☐ ADF
- ☐ TVOR
- ☐ Radar vectoring

5. Atmospheric conditions:

Clouds Cockpit

ACTION	YOUR AIRCRAFT	OTHER AIRCRAFT
Rotating anticollision	☐	☐
Red passing (or nose)	☐	☐
Flashing nav. lights	☐	☐
Steady nav. lights	☐	☐
Landing lights	☐	☐
Ice lights	☐	☐
None	☐	☐

Other _____

	☐	☐
None	☐	☐
Impossible	☐	☐
Unknown		☐

...ar away at this time?

16. How close did the other aircraft come to you?

HORIZONTALLY	VERTICALLY
	☐ Above you ☐ Below you

17. Persons aboard:

Number of persons aboard, including crew	
Number injured, result of evasive action	

CAB Form 352 (12-55)

approach

CALM AND COOL

I had been flying an F8U and after listening to the statistics from the safety office, my belief was re-affirmed that my 3800-hour total, 1000 jet hours and some 80 hours in the *Crusader* placed me in very good shape.

Then I had my incident. On that day the temperature was 88°. After considerable delay due to two minor maintenance problems, I taxiied out to the end of the duty runway.

I was somewhat irritated by the delays that had plagued me, then due to the closing of one runway and several flights of landing aircraft an additional 10 minutes of delay occurred. THAT DID IT!

The wing of the F8U is actuated during ground operations every 5 minutes to exercise the utility hydraulic system, in order to cool the pump and keep the seals wet.

I slammed the wing to the DOWN position and waited for takeoff permission from the tower *but*, this time I put the wing DOWN without immediately raising it to the takeoff position. The tower finally cleared me for an afterburner takeoff and, as I reached 120 knots, I realized the error. The wing-down wheels-down light was not noticed prior to this time due to the fact that it was on the dim or night position.

Holding the aircraft on the ground for some more acceleration, I got it into the air at approximately 150 knots, fortunately without scraping the tail.

Had a military takeoff been attempted, the aircraft would never have become airborne.

While the takeoff itself was not considered "hairy" from a cockpit viewpoint, the fact that an item had been forgotten on the check-list severely "shook" me and reminded me once again that it takes a calm cool head in the seat of a *Crusader*.

ANYMOUSE

PREOCCUPIED

I HAVE read with interest the articles on thought transfer and interrupted thought processes which have led to wheels-up landings. I have now learned that this can happen on a takeoff as well.

It happened while I was chasing a fam pilot on his first afterburner takeoff in the F8U. His AB did not cut in until he had rolled about 1000 feet ("have to cover that in the debriefing" I thought). After he was airborne and had transitioned the wing, I commenced my own AB takeoff—meanwhile keeping an eye on my fam pilot.

I didn't notice how far I rolled but the plane felt a bit heavy as I became airborne. Actuating the wing to the DOWN position at about 160 knots, I immediately picked up a very nose high attitude. Instinctively I actuated the throttle to afterburner and, by this time, was not too surprised to discover that I had performed the whole taffeoff maneuver in military power —having omitted the outboard movement of my throttle hand to get AB at the time I released brakes. Another clue to my omission was the rapid rate at which the fam aircraft was disappearing from my sight.

Lesson: Make your own takeoff. Your full attention should be devoted to your own cockpit procedures; that other guy can tend his own fires for a moment.

NECK SNAPPER

IN READING the Anymouse story of the high altitude tornado (May 1958) I recognized a few points of similarity to an experience of mine.

It was in an F3D on a cross-country from Nashville to the West Coast. The planes were flying a loose formation at 39,000 feet and

Anymouse continued next page

AND HIS HAIRY TALES

Anonymous reports of flight experiences—By sharing your experience you may save another pilot's life—Send us your Anymouse report.

Continued from preceding page

we had just begun to cross a line of thunderstorms when my port engine flamed out. As the loss of altitude started, I informed the section leader, commenced a 180-degree turn, and went on the gages immediately. The section leader began calling ATC.

Then it started. We hit turbulence of a neck snapping intensity. I could hardly read the instruments due to that and the blinding flashes of lightning. The stacatto rattling of hail on the canopy did nothing for my composure either.

Needle and ball were trading sides rapidly. The altimeter began to unwind so fast that the long pointer was experiencing tip stall. I tried to level the wings and put in some back stick but there was no reaction from the gyros to confirm my movements. The airspeed went to 280 knots then started back with help from the speedbrake.

Slightly below 20,000 feet we recovered control and leveled out at 15,000 feet in the soup where we were cleared by ATC. I started the other engine and in a few minutes we were VFR again.

Almost half our elevator was gone but I landed back at Nashville uneventfully. The section leader estimated it took less than a minute to drop 19,000 feet (we had communications all the time) and the G-meter was pegged at 12-G. My radar observer and I agreed that we had been subjected to 2 to 2½ G the whole duration of the fall and that the controls were apparently ineffective above 20,000 feet. The gyros worked before and after the incident.

Wha hoppen—high altitude tornado? I would like to know if these experiences are unique or if some other mice have had their tails twisted likewise.

DOWNWIND SOCKY

WE WERE returning to Corpus at night in an S2F, flying on an IFR clearance but in good VFR weather. Calling approach control we were cleared to commence a range approach. Over the low station we received further clearance to land. We expected clearance to 31L and this is what we heard and so used a modified approach. With the duty runway in sight (or at least we thought it was the duty) we continued with our "modified" approach, calling turning base, and I made a normal though slightly fast landing.

All of a sudden the tower barked out instructions for an AD to take a waveoff because some aircraft had landed downwind! Who . . . Ha . . . Gulp. He's talking about me. I landed downwind! Our clearance was actually to 13L and I landed on 31L. The AD had been cleared to land on 13R so he was headed right for us.

Here the copilot's statement commences.

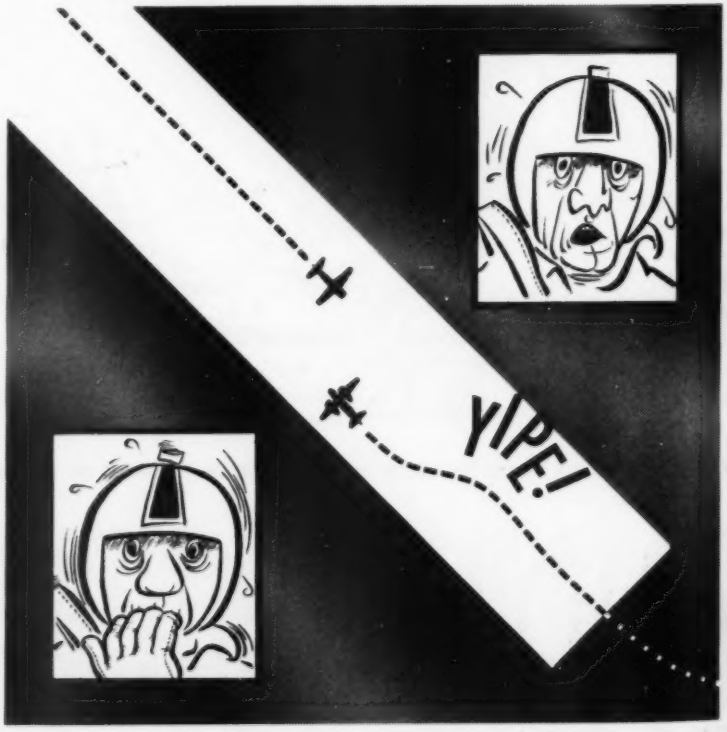
At touchdown we seemed to be rolling a little fast but there's 7000 feet so there should be no trouble. The tower calls "AD on final pull up and take it around, there's a plane on the deck landing downwind."

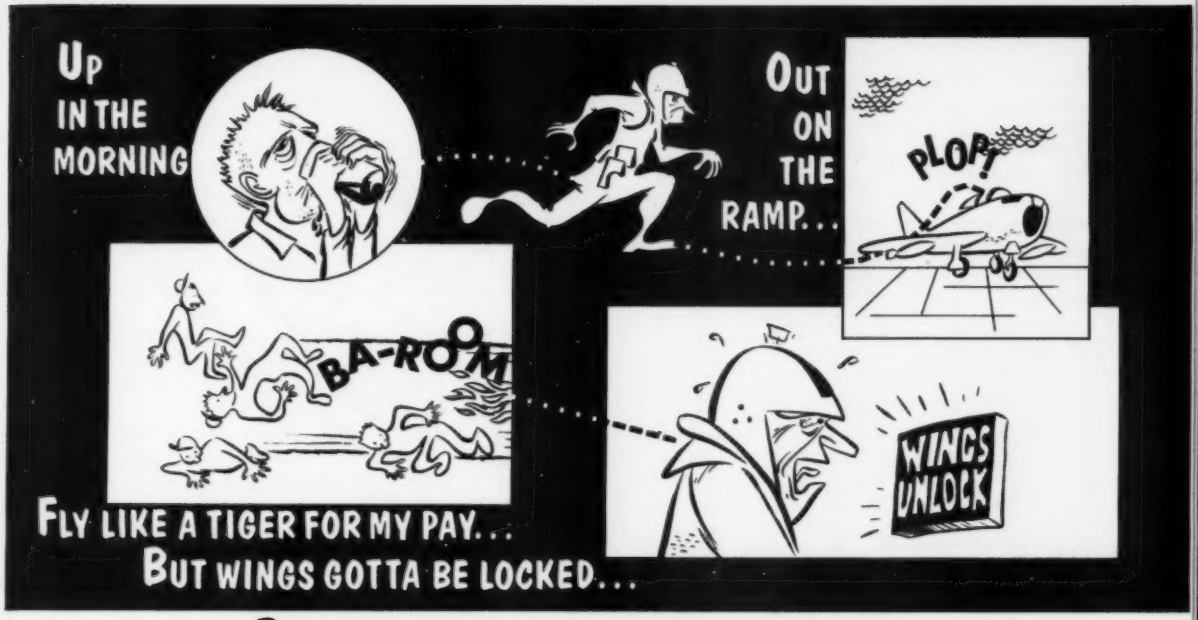
"I can't" says the AD pilot, "I'm on deck."

"Stay on the side of the runway" the tower then says.

Hearing this and sighting the AD lights, I kick the left rudder *HARD!* We veer over to the runway lights and then straighten out. The pilot thought I had hit the rudder by accident and he started to angle back to the center but he caught sight of the AD as it roared past and it was all over.

If we had used head work by listening, observing aircraft heading with runway heading, tetrahedron and the tower's wind direction, the incident would never have happened.





BEFORE I ROAM 'ROUND HEAVEN ALL DAY.

SAME OLD STORY

WE HAVE a buddy who won't submit an Anymouse so we are doing it for him. On the particular day, after spending the night in celebration and after a substantial breakfast of half glass of tomato juice (with just a dash of Worcestershire Sauce), he walked into the readyroom and sniveled into a non-scheduled hop.

He then hurried across the hangar to catch three other pilots who were already taxiing out. After scribbling his mark on the yellow sheet he dashed directly to the FJ-4 cockpit without the formality of a preflight. He lit off and completed strapping in at the same time (which saves at least 20 seconds). In the chocks he requested takeoff clearance, blasted out of the line blowing plane captains, chocks and tie-down gear helter skelter.

Once airborne he attempted to roll into a left turn to depart the field. CLANK! Aileron lock! A quick steely-eyed hysterical glance into the cockpit, probably the first since he climbed into his machine, showed the wing lock handle in the unlocked position. At this time, with his mind working like a steel trap, he reached over to lock the wings and almost pushed the spread-fold handle to FOLD. This would have ended our story but he stopped in time and locked the wings, regaining aileron control and living happily ever after. Same old story—"Hurry up, only the new boys use the check-off list." B-o-O-O-M!

HANDLE TROUBLE

AFTER an unsuccessful simulated flameout approach in an F3H-2N — I was high and fast — I touched down about 3000 feet down the runway and decided to go around. Smoothly the power was applied and I held the nose down. No backside of the power curve for me!

I brought in the speed brakes, dropped flaps and with professional smoothness started to raise the ram air pump. The RAP handle was halfway up when I suddenly realized *it was the gear handle I was moving!*

Moral: Think and look before you move. The mental picture of me sliding off the duty runway with my wheels where they shouldn't be appalled me.

NEAR-MISS

IT WAS a beautiful spring day with 10 miles visibility and 2000 scattered. I was flying an OE-2 and after my third pass for a message pickup at home field, I called the tower and reported departing the message pickup pattern. When the tower "rogered" I turned to an outboard heading 90 degrees from my downwind heading.

Holding this outboard heading for about a minute while changing to a tactical frequency, I ended up slightly within the three-mile control zone of the field. Then Whoo-om! From out of the blue

Continued from preceding page

came an R4Q approaching from my (pilot's) blind spot. The separation between aircraft seemed less than 10 feet.

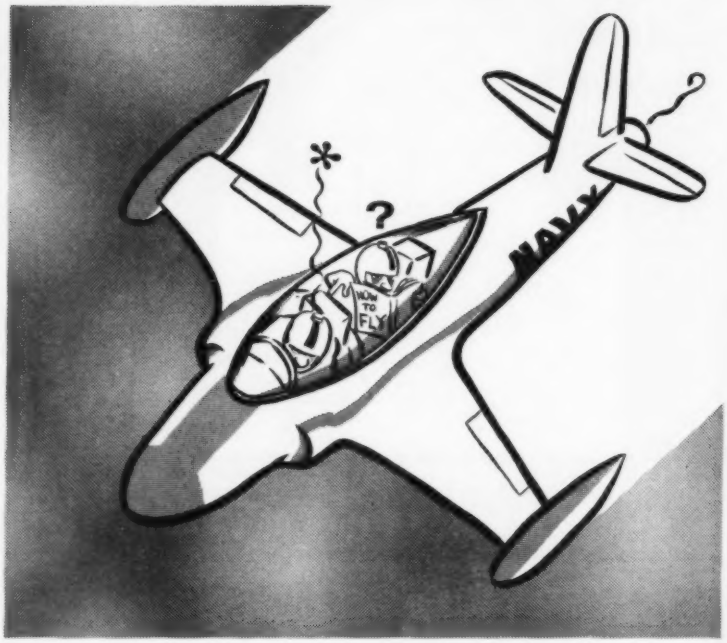
Tower personnel said later that the transport made a rapid rate descent from 4000 feet. My passenger did see him high and a good distance out and shouted to tell me. Quite naturally I didn't hear him through my hard hat and above the engine noise. Since the radio was set for transmission he couldn't tell me over the ICS. The tower also said they notified the R4Q of the OE in the touch-and-go pattern making message pickups, to which the R4Q "rogered" with a "have them in sight."

Recommend: passengers; I don't give a hoot if the radio is set for transmission, *get on the horn and warn.* Don't switch away from tower frequency within the control zone without telling the tower.

CREW CLUE

AT APPROXIMATELY 1450 an alert was given that a TV was in difficulty and was being led home by an F9F. The difficulty was believed to be temporary hypoxia. The TV was observed to land somewhat short of the runway on the overrun and proceeded to taxi into the line. The aircraft was met by the Flight Surgeon and several others to determine the exact nature of the emergency.

The pilot was noted to be completely exhausted and extremely uncoordinated in all of his movements. It was necessary to aid him in order for him to alight from the aircraft safely. He was immediately taken to the ambulance and questioned momentarily by the Doctor and the Operations Officer. His ability to answer questions was well below normal and it was apparent that is was quite difficult for him to even remember his name and the date.



Interview with the pilot and the crewmember at later times disclosed the following events: This was the crewmember's first jet aircraft flight, however, he had had previous flights in an SNB. He was properly checked out in the use of the oxygen system and had been through the pressure chamber and the ejection seat check-out. He was briefed and instructed by the pilot to takeoff on 100% and then switch to normal oxygen after becoming airborne.

The flight proceeded as scheduled and in all respects in a normal manner until at about 25,000 feet the pilot complained about feeling "woozy". The pilot told the crewmember he was going to a lower altitude and was returning to the vicinity of the field.

When the plane started down at a steep rate of descent, the crewmember called to the pilot and received no answer. After several calls, the crewmember decided something was wrong and when the ground appeared to be getting very close he seized the control-stick and pulled the airplane out of the dive. The crewmember flew the aircraft level, intermittently calling to the pilot. Finally the pilot answered and acknowledged the fact he was hypoxic. He explained that he was all right but couldn't see the instruments clearly nor read any of the numbers on the instruments. He was disoriented and could not recognize any of the land area. The pilot checked with the crewmember on his fuel state and made certain all his fuel switches were "gang-barred." He then called the tower for a DF/steer.

The tower took control of the situation and kept a continual conversation going on between the tower and the pilot. When it was noted by the tower that the aircraft signals were getting weaker and it was apparent the aircraft was going away from the station, the tower directed an F9F to intercept the TV. The F9F intercepted the TV satisfactorily and led the

TV safely to the field. The pilot made a somewhat erratic but safe landing and taxied into the line.

A complete examination of the plane's oxygen system was executed and the system checked out satisfactorily. The pilot's oxygen mask was noted to be in very poor condition, in that the rubber facial fitting was not properly glued and apparently did not fit the face well. Inasmuch as the crewmember was not affected with hypoxia and at no time experienced any ill effects from lack of oxygen, it is believed the entire incident was due to an improperly fitted mask.

Investigation revealed the pilot's oxygen mask to have been issued new from Supply three weeks previously. The mask was satisfactory.

The Medical Officer's Report verifies the facts of this report and further states that there was no outside possible causes discovered that might have caused this case of hypoxia. There were two other reported occasions of hypoxia in the pilot's record but neither were as serious as the present case.

This incident brings out the simple fact that the crewmember actually saved a pilot's life, an airplane and perhaps even his own life. The crewmember knew very little about the aircraft, this being his first jet flight. Therefore, it behooves all pilots flying aircraft which carry crewmembers to familiarize the crewmembers with some of the operating mechanics, such as the wheel lever, wheel indicator, airspeed indicator, altimeter, gas gages, etc.

DISTRACTION

During a test hop the airspeed indicator of my jet started a 15-knot rapid fluctuation below the speed of 145 knots. Calling another aircraft in the vicinity, I got an airspeed indicator check by flying wing on him as he called off his airspeed indication. When he got to 125 knots (7 knots above stall) I was indicating 145. As angle-of-attack was inoperative, this was a very dangerous error.

I thanked the helpful pilot and went on with the test hop . . . Coming into the break over the field after the hop I could see that I was very high (altimeter had been set to field elevation and altimeter error was to be obtained after landing). After being cleared to break and commencing the procedure I noticed the utility hydraulic pressure gage was spinning like a roulette wheel and doing about as much good as one.

Immediately I reached down and checked both my normal and alternate flight control systems. They were both UP. By this time I was at 175 knots and I lowered the flaps. At the 180-degree spot I checked my gear indicators; all indicated the same and the light was out in the handle. I went over my landing X-off list and reported "on base—down and locked." As I was high I asked the tower for the current altimeter setting and then given a setting which was 1200 feet off what was set in the window so, I started cranking that in at the 90-degree position. At the 45 (still cranking) I was given a waveoff by the runway officer for *NO GEAR!*

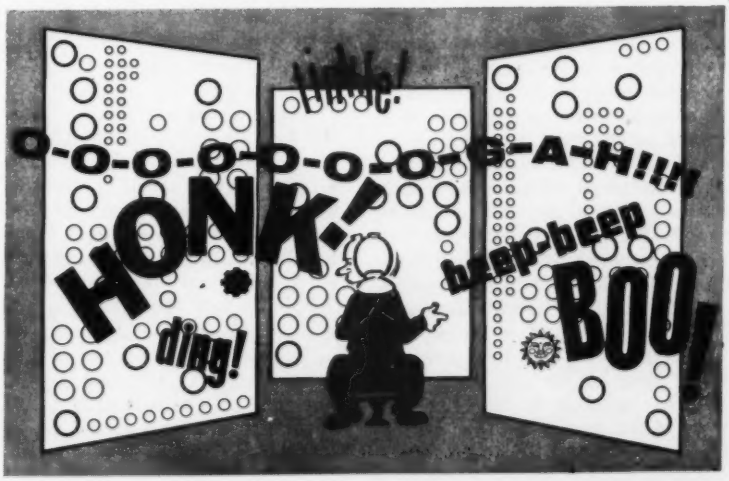
I took the waveoff while rechecking the gear indicators. The indications hadn't changed and I knew I'd have to drop them by the emergency system. This I had done the previous week when I had nearly the same situation.

After executing a 90-degree right turn I started my trouble shooting prior to my last ditch method of lowering. EUREKA! Why was the light out? The handle was in the UP position! Why did the indicators all indicate the same (UP, UP, UP)? Simple, the gear handle was UP.

The safety officer and I had a long discussion on the incident and came up with something like this: Habit interference at the usual spot for lowering gear. I was distracted by the hydraulic pressure problems at the 180-degree spot which is the first position I check down and locked. I misread the indicators, perhaps because my mind was on the static system malfunction.

At the 45-degree position, where my last check of gear and flaps prior to landing is made, I was cranking the altimeter like a model "A" Ford (I'm too young to know about the model "T").

Many hours I've spent as a wheel watch, cussing and discussing the blamed instruction that puts an officer out on the runway with a radio, but it paid off in this case.



headmouse

Dear Headmouse:

Two jets meet head-on at a closing speed of 700 knots. The destruction of two aircraft and one seriously injured pilot are the cost. Almost of necessity the cause of the accident is pilot factor. Why? A VFR day, CAVU except for a hazy condition at altitude, and both aircraft part of two different gunnery flights.

The answer seems obvious enough: the lookout doctrine was poor, the pilots were not alert and both flights should not have been in the same area.

But the obvious is not always true.

Put yourself in the plane of one of these pilots. You are No. 2 in a column of three aircraft, "Green Flight," climbing to position for the spacing run. You are trying to keep the tow plane in sight, maintain an interval on the leader, set up your fire control system and maintain a lookout for other aircraft. Suddenly the leader calls out another aircraft in the area, warns you to look out. You look ahead, haze and scattered white clouds, and then . . . head on, closing at almost the speed of sound you see the onrushing jet. You pull back on the stick but before the plane can respond you meet, your right wing is gone and you can only marvel at the fact that you are still alive before you eject.

Put yourself in the place of the other pilot. You are trying to rendezvous with your tow plane, you spot the tow, then see that it isn't yours. You realize that there is another flight in the area and increase your vigilance. You pick up your towplane on ADF and turn towards him, looking ahead and WHAM! The engine must have blown up, you think, there is a hole in the canopy, almost all of it gone. The plane is on its back, spinning, no amount of effort can move the stick, and you have no choice but ejection.

What of the other pilots—in these flights while all this is taking place? The No. 3 man in the column is checking his radar, hears the warning and looks ahead at "Green Two." Nothing there, but suddenly No. 2 is rolling, his right wing is falling below him. No. 3 never did see the plane that hit Green Two.

The tow planes, then, what were the pilots doing? The pilot of Green Two also looked at No. 2 when the warning was called. He too saw the wing fall off the plane, but never saw that other aircraft. The fact of the matter is that only two persons in that group of airplanes knew there had been a mid-air collision: the leader of Green Flight and Green Two who saw the other plane a split second before the collision.

Even one of the pilots involved didn't know he had had a mid-air until he was told of the incident when he was picked up by a fishing boat after parachuting to safety.

So here we have a situation where two of five pilots see an aircraft that all knew was there. The two pilots involved had better than 3500 hours each in military aircraft. How can we explain this, then? Let's consider all the factors.

The necessity for operating large numbers of aircraft in a confined area naturally increases the danger of mid-air collisions. The situation is aggravated when these aircraft are engaged in training that requires that their attention be diverted to tow banners, targets, flight instruments and other aircraft.

While a great deal of attention must be given to the detection of high speed aircraft (before they can close to a dangerous range), attention must also be given to the tows, targets and other planes in the flight if adequate results are to be obtained from the training. When more than one plane is engaged in the training, it becomes less difficult to maintain a lookout, but the problem remains, in that an almost unceasing alert must be maintained in order to prevent two high speed aircraft from closing to a precarious position. It takes but a few seconds to create a dangerous situation between aircraft which were, only seconds before, in no way endangering one another. Either aircraft can

Have you a question concerning aviation safety? Send it in to Headmouse on an Anymouse Report and he'll do his best to help.

be in such an attitude against an unfavorable background that it is virtually impossible to detect until its position is one of imminent collision.

This situation is easily created when white and grey aircraft are operating in hazy or cloudy conditions. This does not mean to imply that all mid-air collisions are caused by the color of the aircraft or training requirements or operating areas. It does imply, however, that these elements are compounding an undesirable whole that is becoming increasingly dangerous.

A factor in the sighting of high speed aircraft that has been given little attention is that of "re-focusing" on distant objects. Jet pilots must spend a large part of their time looking in the cockpit at instruments, fire control gear, oxygen readings and the like. Whenever a pilot is required to sight a small object at a distance after looking at an instrument a few inches away, it is almost impossible to focus on that object instantly, even when looking directly at it. When aircraft are on opposite headings, this delay can mean disaster when translated into distance covered by the closing aircraft.

In many cases instrument training, jet penetrations (simulated), high altitude bombing, tactics, GCI, and general training are being conducted in a relatively small area. On a good day, these areas are almost saturated with aircraft, local and transient, and the better the flying conditions, the more aircraft will be in the air. This in part explains the increased number of accidents in CAVU conditions. While attempts are made to confine particular training phases to unconflicting areas, the speeds of airplanes, winds, turning radii, make complete separation impossible within the area.

At present it is the responsibility of the pilot to assure a safe interval between aircraft and to maintain a watch for other planes, but the pilot is becoming increasingly hard-pressed to cope with that responsibility. The most vigilant pilot can find himself in an impossible situation in the few seconds it takes to check his instruments. The pilot can, and must, do his best in maintaining a lookout, but there are assuredly many complicating circumstances, increasing in number and intensity, that are making it less likely that his best will be enough.

D. E. SWANK
LTJG, VF-103

Agree that jet operations impose a greater mathematical probability of mid-airs, especially in a head-on situation where an aircraft can approach from the threshhold of visibility to the collision point in a few seconds.

In the situation you described, it looks like a large part of the cause can be laid to planning and/or supervision—two gunnery flights in the same area without separation? Someone apparently wasn't where he was supposed to be.

And the leader, could he possibly have given a better warning? Since he actually saw the intruder, I wonder if he couldn't have called "Bogey 12 o'clock level close" as he maneuvered his flight out of the way?

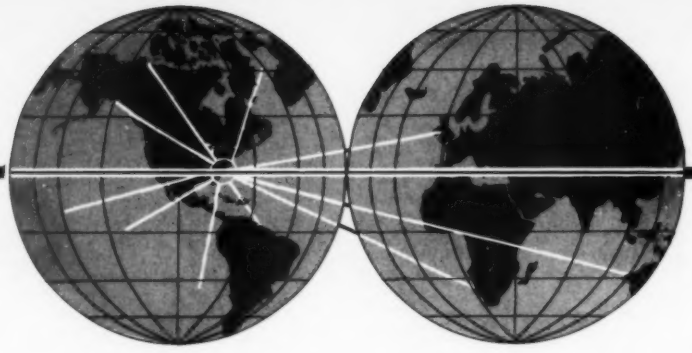
Admittedly the problem is a tough one, but let's not hastily blame high speeds as the incurable cause. We had mid-airs in F4Fs and Jennies and Spads, and in the FE-2, which had a top speed of nearly 90 miles an hour! Even turtles have been known to collide.

The danger of mid-airs will probably be with us for some time, despite whatever we may do to guard against it. But are we doing all that we can? Supervision, briefing, flight discipline, communications discipline, and VIGILANCE are all factors which can contribute to, or detract from, the number of mid-air collisions.

Very respectfully,

Headmouse

MONITOR



Prevention of Mid-Air Collisions

The feasibility of painting airships with international orange and providing anti-collision lights was discussed. The installation of the anti-collision lights atop the envelope and beneath the car will continue as rapidly as possibly. This command will initiate correspondence in regard to the feasibility of using international orange paint for making and ease of visual sighting.—*Fleet Airship Wing One*

Red Line Prop Clearances

The S2F aircraft are now parking with the wings folded. The props of the S2F extend approximately 18″ outboard of the wing stubs when the wings are folded. A recommendation was made that red lines be painted on the ramp to indicate prop clearance beyond the wing stub of the S2F aircraft.—*NAS Willow Grove, Pa.*

Flight Gear Check-out

It has come to the committee's attention that some F4D pilots are experiencing difficulty in accessibility of ejection seat face curtain. The problem is associated with size (height) of pilot, position (elevation) of the seat, and mobility while wearing the partial pressure suit. The committee recommends that every F4D pilot receive a cockpit check-out relative to this item by the squadron's safety officer-flight surgeon team while wearing his flight gear.—*3rd MAW.*

Pull-up Altitude

The AJ pilot was seen to vigorously skid his plane at about 2000′ altitude in an attempt to get his starboard landing gear into the down and locked position. After the failure of the vertical stabilizer of an AJ last year in a similar maneuver, it is recommended for crew safety that a higher altitude be used, if possible, in case the crew has to abandon the aircraft.—*Sanford*

T-34 Turning Radius

Maintenance and line personnel at some stations tow the T-34 with mules. This can easily result in damage to the nosewheel mechanism due to its limited turning radius. Pilots flying the T-34 on cross-country flights will insure that, should it become necessary to tow the aircraft by mule, line personnel will be cautioned not to exceed the radius of turn limits on the nose gear. Whenever possible, the aircraft should be respotted without the use of mechanical towing devices.—*MCAS Quantico*

EXCERPTS FROM SOME OF THE NAVY'S SAFETY COUNCILS THROUGHOUT THE WORLD, WHO PROVIDE LOCAL LEADERSHIP AND EMPHASIS TO THE NAVAL AVIATION SAFETY PROGRAM.

Masks for P2V Crews

Recommended that the Parachute Loft prepare a minimum of five cloth containers equipped with seven low pressure oxygen masks each for issue to P2V crews. These masks to be checked out by the plane captain prior to scheduled flight for emergency use by the crew in case the aircraft is forced to fly for prolonged periods at altitudes above 10,000 feet during daylight hours or above 5000 feet at night.—*NAS, Floyd Bennett Fld*

Type of Experience

An explanation of the term "pilot factor" as applied to this accident is felt to be in order. The pilot was a relatively inexperienced plane commander, having been designated just 19 days and 20.9 flight hours previous to this accident. His total time in type is 199.0. It is not thought to be excessively philosophical to state that there is a type of experience which is obtainable only as a plane commander and which is necessary to cope with certain emergencies—*2nd MAW.*

All-Weather & Vertigo!

The increasing all-weather capabilities of these aircraft make it imperative that the aviator and flight surgeon have a common understanding of both practical and theoretical aspects of vertigo. (Please see page 28)—*El Toro Safety Council, Medical Committee*

Really a Heel

A pilot was recently issued a pair of flight shoes with leather heels, hob nails and steel heel plates. This type shoe has no place around or in aircraft and personnel should not accept such gear nor add such metal to their shoes. One loose spark could be dangerous.—*CNATra*

Practiced Preaching

"Except for the good thinking of an AD pilot some of us might have had to spend the holidays fishing around in the inland sea for his airplane. Out on a local split instrument flight this gent experienced a fough running engine and high cylinder head temperatures. Keeping in mind airfields available en-route, he headed for home. He arrived at a point that meant either flying approximately 35 miles over mountains, 50 miles along the coast or landing at another field. He demonstrated what we preach in aviation safety and landed before really getting into trouble. He was back that night in the club and the airplane was back the next day. In this case an ounce of prevention may have saved an airplane."—*MWSG-17, 1st MAW Jan 58*

Ripped Ship

The bag ripped explosively due to the wind force . . .

Rarely do APPROACH readers have an opportunity to read of an aircraft accident in which no one but the forces of nature can be blamed. And this is justifiably so, for APPROACH must devote a major portion of its space to the treatment of accidents which point up weaknesses or conditions which can be corrected. It is with mixed emotions therefore, that we report here an accident that did cost hard tax-paid dollars, but has no "should-have-done-this" conclusion. Instead, its primary lesson might be: Beware—this *could* happen to you; would you have done the same good job?

The ZS2G-1 airship departed base on what was to be a routine operational training flight. Nearly 36 hours later it was intentionally "ripped" (deflated) on order of a Ground Handling Officer who saw that continued efforts to mast it would be nearly impossible and highly dangerous to the safety of the airship crew and the ground handling personnel.

During the intervening hours between launching and deflation the crew's ingenuity and "can do" was called upon several times in attempts to refuel by nonstandard emergency methods; the only crew injuries sustained were two cases of gasoline burns

from fuel spilled in emergency refueling. The ground handling crew was also beset by problems —weather and inexperience. Even an experienced crew would have had a hard time in the strong wind with gusts, but the majority of experienced men had worked all the previous night at refueling the airborne ship, and had been supplemented by fresh but untrained men recruited from local non-airship commands, including USAF personnel.

When the forecast indicated no improvement the command pilot, faced with an extremely fatigued crew, danger of fire from any further refueling attempts by his fatigued crew, and the imminent danger of a night landing with inexperienced ground personnel, chose to make a day landing before conditions got any worse. He was further prompted toward his decision by signs that ballast pump failure was imminent.

Masting was hampered by fouling of the nose pendant with the starboard handling lines, and the attempts to get it unfouled were hampered by slow response of the ground crew—partly due to wind and engine noise and partly due to personnel who were apparently enraptured at the gyrations of the huge monster they were handling and succumbed to "target fixation" of a sort.

A rain squall upset the can of worms entirely by rolling the ship, causing one prop to strike the surface. The injured engine was secured and the airship continued to roll from side to side and to pitch violently. With one engine out, a waveoff was out of the question as the ship would literally have "backed out to sea," and at this point the Ground Handling Officer and the command pilot agreed that it was time to "rip the ship." HTA pilots, this is equivalent to jettisoning your wings, and is accomplished by the ground crew hauling on a red line which is passed down from the airship car.

The blimp bag ripped explosively due to the wind force, and settled on the car, whose good engine had been secured moments before. The flight crew evacuated the car, darkened by the enveloping folds of fabric, through a rear cargo hatch with no further injuries. Two minor injuries were sustained by ground crew personnel.

In its analysis of the accident the Board indicated ". . . there was no information available . . . that weather conditions were worsening . . . the decision to attempt refueling from the LEYTE . . . was justifiable under the circumstances . . . left no recourse except to proceed to Bermuda . . . pilots exercised good judgment in conserving fuel and advising the crew to get as much rest as possible . . . the decision to attempt to land upon arrival was justified . . . fouling of the nose pendant . . . could not be foreseen . . . the decision to refuel rather than land the airship was appropriate . . . the method used to refuel, while definitely hazardous, was the only method that could be used . . . it was noted . . . pilots' replies on UHF were at times on the verge of inco-

Continued next page

hand consequences

Continued from preceding page

truth and consequences

herency . . . in view of the conditions existing . . . only alternative was to deflate it . . . the primary cause of this accident was the weather . . . a secondary cause was inexperience of a large majority of the ground handlers."

Also brought out in the AAR was that the only LTA qualified members of the ground handling party had been up all the previous night refueling the blimp—this immediately after arriving BDA by air, and by final landing time they and the flight crew were "extremely tired and near the point of exhaustion."

Any listing of individuals participating runs the risk of incompleteness; however those mentioned directly in the AAR are deserving of mention:

Flight crew officers — CDR E. D. Nunnery, LT O. J. Shuler, LTJG R. E. Leaman, airship commander, and ENS A. A. Cather.

Ground handling officers — LCDR C. Manship, LCDR H. C. Koch, LT F. N. Klingberg, LT L. A. Ahrendts, ENS J. M. Gowdy, Jr., CPO Makowski.

Directly participating and contributing valuable assistance were units of the USAF, U. S. Army, USCG, Bermuda Civil Police, the LEYTE, which refueled the airship aloft by sending up a rubber "bag" of avgas when normal hose refueling methods failed, the survey ship ATLANTIC, the Esso Standard Oil Company, Bermuda, Mr. John Trott, Austin Motor Car dealer, and the CIC School which sent a *Connie* to Bermuda with a ground handling crew from the parent squadron. VP-45 VP-49 and FASRON 111 lent valuable assistance and personnel.

While airship accidents are infrequent due to numerical improbability and extremely low mach numbers, the operating problems faced by airship crews are by no means lessened—they are exposed to forces and conditions which HTA aviators need hardly consider. The above recount is a tribute to those low-and-slow flying sentinels and the ground personnel who planned, anticipated, jury-rigged and operated under severely adverse conditions to bring a tedious danger-and-fatigue-ridden flight to a safe, if deflated, conclusion.

DELAYED WEATHER—Prior to clearing two F4D-1 pilots for a scheduled instrument hop the operations duty officer obtained the latest weather available. At this time it was given as 2000 feet overcast with 3 miles visibility and was predicted to remain the same. The flight leader planned a GCA pickup upon completion of the hop and briefed his wingman to separate after breaking clear to make individual landings. A speed of 170 knots was planned by the leader to aid his wingman in separating without getting slow.

The hop went as planned and the flight leader got the weather before penetration. Both ceiling and visibility had lowered; 1500 overcast with one and a quarter mile visibility, but the leader felt this would allow plenty of time for the pre-briefed landing and he didn't change the plan. The alternate was reporting a high scattered layer with 7 miles visibility.

By the time the two F4Ds were on GCA final the weather had gone to a thin obscuration, measured 600 feet broken, 3/4-mile visibility in drizzle and fog. "At about 1 mile," said the young wingman, "the leader dropped speedbrakes to slow down. At this time we were still IFR but I could see well enough to start to drop back and position myself for landing . . . due to the weather . . . I was unable to get the separation we had briefed for . . . and I found myself dropping below the leader's altitude and getting slow. I added power to about 92-93 percent. It took two or three seconds for the power to come on as I had been at a low power setting trying to get separation. . ."

The wingman's F4D-1 touched down short of the runway in a nose-high attitude with power still on, damaging the tail section.

Significant factors in the accident, according to the board was the pilot allowing the aircraft to get on the back side of the power curve and it thus settled into the overrun, and the weather that existed at the time of the landing approach.

"The weather factor in this accident," said the squadron commander, "points out anew the need for control agencies to keep abreast of *existing weather* during periods of deteriorating weather conditions. This is necessary so a pilot can expect to experience weather very close to

that provided him when he checks in with approach control or GCA . . . had the actual weather been known by the lead pilot in this case he would undoubtedly have elected to proceed to his alternate. . ."

DUMPED — After the flight deck had been tidied up and the damaged F4D-1 sent below, the accident board discovered the following items of information:

The pilot had four hours sleep prior to the scheduled flight.

He had eaten breakfast.

Though it was early in the morning there was sufficient light available for him to preflight without a flashlight.

The pilot was not in the habit of carrying a preflight card.

Prior to the accident he did not use an efficient system for prepositioning cockpit switches in that he neither utilized a preflight card or a "touch" system for setting up the switches in the cockpit. (And neither did the plane captain who signed the yellow sheet!)

"I conducted the normal pilot's preflight inspection and was scrapped in the cockpit," said the pilot. "At the order to start, a normal start was made and I gave the unplug signal at approximately 50 percent rpm.

"Immediately the landing gear indicator flopped to show unsafe and the nose of the plane settled easily to the deck. I stood on the brakes and shut down the engine.

"The gear handle was in the up position and the red light was on."

FORCE OF HABIT—Arriving over the unfamiliar air station at night, the pilot turned final and lined his TV-2 up for landing on the field's east-west taxiway which is to the left and parallel to the runway. He flew over two aircraft in the warmup area and touched down about 1800 feet down the taxiway.

During the rollout the TV-2 crossed directly behind a transport which had just cleared the taxiway. At a point where the taxiway turned (4000-foot mark) the jet trainer continued straight ahead onto the grass for another 1800 feet.

The cause of the incident was undetermined but investigating personnel believed the pilot picked the taxiway for his landing from force of habit. At his home field the runways are to the left of the taxiways and he followed this procedure at a different field.

SHORT SHORTS— . . . It is, therefore, concluded that the pilot stalled the aircraft on takeoff by prematurely lifting the aircraft and retracting the gear during a gusty crosswind condition.

It is recommended that pilots keep their left hand on the throttle instead of the landing gear control lever during takeoff and until sufficient airspeed is gained to safely retract the gear.

ROUTINE—When the lead FJ-3 pilot broke over the runway the chase pilot took a normal three-second interval. As the aircraft slowed to 200 knots the chase pilot lowered his landing gear handle and flap handle. At the 180-degree spot he checked both handles again, then reported "gear down and flaps down" to the tower.

Following his report the pilot noticed his speed to be excessive (160 knots) and he had difficulty slowing the aircraft. He was so intent on his airspeed and alignment with the runway that he did not notice his gear indicator or the red warning light in the landing gear handle.

As the FJ-3 turned into the groove the runway duty officer saw that the gear doors were down but that the gear was still up. Two flares were fired and the jet waved off while the pilot quizzed the tower for the reason for the flares. He was told of the gear-up condition and then he looked at the gear handle and utility hydraulic pressure gage. The gear handle was DOWN with the red warning light glowing and the hydraulic pressure was indicating ZERO.

Later investigation showed the utility hydraulic pump to have failed completely after takeoff. In commenting on the initial gear-up pass the commanding officer noted that the pilot erred in not checking his utility pressure during his landing approach.

Much has been said about landing checklists and wheels-up landings. Here again is a case of an experienced pilot, making a "routine" landing unaware of his predicament. The worth of the wheels watch and runway duty officer is again expressed in the prevention of what could have been a serious and embarrasing accident.

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HEADS UP!—Sept. 56, Page 4
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IDLE MIXTURE—Sept. 56, Page 32

These articles and many others are as valid in accident prevention today as when they were originally published. Refer to your Safety Officer's or Flight Surgeon's files. Reprints or extra copies may be obtained by writing APPROACH, NASC, Norfolk 11, Va.


VERTIGO

Vertigo struck again, but this time it was identified by the victim.

THE LT(jg) was a happy go-lucky young naval aviator who had joined the squadron barely six months ago, direct from CNATRA. His flying mates from the squadron and from the training command describe him as having been "not the hottest" but an average good aviator. He had trouble with basic instruments (but then who didn't).

In his squadron he was flying the AD5N and after much work and two unsuccessful "checks" he was given a "satisfactory smooth" on his instrument procedure by a highly qualified check pilot. He was a happy boy, married with a two-and-a-half-year-old daughter. He drank little and was known generally as a homebody. To the knowledge of his friends he had no domestic strain.

One characteristic was outstanding, he often quoted little "sayings" over the radio while flying. His lack of radio discipline was not objected to because of its benign nature and it never caused him any difficulties.

The squadron is preparing for day- and night-qualification cruise and the JG is one of the hot list. It is an early spring night and he is out bouncing. He gets four cuts, then he secures and drives home, arriving about 2030 to spend the evening as "baby sitter" while his wife goes to a shower. It is a restful night and he is not tired even though he has been flying nights in preparation for the qualification cruise.

Routinely after the night hop he comes in at noon, but next morning he rides in with his car pool. He has eaten a good breakfast, is bright, cheerful and eager to fly. The weather is down some and looks good for practice GCA's. The squadron sends out a qualified pilot who flys the pattern then reports conditions satisfactory to send out the less experienced. The ceiling is 1200 feet, visibility three miles with light rain. A fine opportunity to spread the wings of the capable but as yet experience-limited boys.

The JG grabs one of the newer ensign pilots who hasn't flown yet in the squadron to ride shotgun in the right seat, glad to watch any time. Then with an experienced radar man in the seat aft they launch.

The first GCA pass is normal. "Three Five Eight Zero this is GCA. What is the present ceiling? over."

"Eight Zero, I'm at 1100 feet now and in the soup."

"GCA roger. Your lost communications procedure remains the same . . . ." and the second pass is made.

The weather deteriorates some to about 600 scattered 900 overcast 2½ miles in light rain. All transmissions are vividly transcribed on the tape recorder of the GCA unit.

At the end of number two

Continued from preceding page

pass: ". . . any comments"

"3580 request to make this next one a final landing because it's almost below minimums."

"GCA, roger, understood . . . "

"3580 this is GCA. Altimeter three zero two zero."

"Roger altimeter."

"3580 this is GCA lost communications remains the same."

"Eight zero."

"3580 this is GCA turn right to a heading of three four zero degrees, maintain fifteen hundred feet over."

"Eight zero."

"3580 this is GCA, new altimeter three zero one nine, over."

"Eight zero."

"3580 this is GCA. Turn right to a heading of zero four zero degrees maintain one thousand five hundred feet."

Ten seconds later, very loud and clear, "Vertigo! Vertigo! Wherefore art thou, vertigo?"

"Three five eight zero, say again."

"Three five eight zero this is GCA say again, over."

The tower was notified immediately that a plane was lost. The target had disappeared from GCA's scope four miles north of the station which at that range would indicate that it had gone below 100 feet. The 'copter quickly located the burning scattered wreckage in the woods. The crash was an unsurvivable type.

All too often we say a pilot probably got vertigo, but this is one time he told us so most clearly.

What Causes It

When asked about vertigo, one young aviator said, "haven't the slightest idea what causes it," but added, "whatever it is, fix it." *Vertigo involves inherent normal physical reactions of the human body. It cannot be eliminated.* However, by learning as much as possible about vertigo and vertigo-inducing situations, the pilot becomes better equipped to deal with vertigo's dangers. Herewith some prescriptions and info, which when taken externally, may help . . .

Vertigo is an error or illusion of spacial orientation — an experience in which the pilot is confused about his relationship to the earth or to other objects in the sky. In other words, he doesn't know which way is up. Actually, pilots aren't its only victims. Birds, ballet dancers, and Eskimos in kayaks can have it too.

Generally speaking, vertigo can be divided into vertigo of attitude and motion, and visual vertigo.

No respecter of time or place, vertigo can occur under conditions of excellent visibility as well as in darkness, rain or fog. It can happen to a section leader as well as to a wingman. Cases have been reported where pilots got vertigo while taxiing their planes. Other cases have occurred immediately after takeoff and even in the landing circle after a one-half- to two-hour flight.

Poor visibility is one of the most frequent causes of vertigo. Mixing contact and instruments, flying alone and flying wing are associated with many cases. Fatigue, frustration and hypoxia can be conducive to vertigo. In any case of vertigo, usually a number of factors are involved.

Whether experienced in prop-driven aircraft or jets, vertigo is essentially the same and its causes and remedies are similar.

In its research program, the U. S. Naval School of Aviation Medicine has made a comprehensive study of vertigo experienced by jet pilots.* This study gives a good cross-section of the aviation vertigo picture.

In the study, a group of 137 Navy and Marine Corps pilots flying operational jet aircraft were interviewed on their personal vertigo experiences. All but five of the pilots in the group had experienced vertigo in jets. Their experiences were similar to those in propeller-driven aircraft.

Most of the pilots had had attitude and motion vertigo, most often the illusion of turning.

Here are some of the pilot's statements taken from the study:

"I was up practicing tactics in an F7U-3. I was flying wing and we went into a 60-degree bank. I was concentrating on maintaining my position and after about 90 degrees of turn, I felt like I was going straight down in a steep dive. Actually, we were not changing altitude."

"I was in a climbout from _____ AFB through a solid overcast. Tops were reported at 20,000 feet and I was perturbed when I didn't break clear. I thought I was in a straight climb, but on looking at the gyro, I found I was in a 60-degree bank. I concentrated on the instruments and in a few seconds the feeling disappeared."

"We were taking off in formation from _____ Field. We went into the soup at 1000 feet. During the climb the leader called when he

* Project No. NM [illegible] Report No. 44, Clark and Graybiel.

was making turns as he climbed. I would swear that when we were straight and level, I was in a turn and when in a turn we were straight and level. It lasted for perhaps a minute and a half until I used my instruments."

"I was flying an F9F-6 aircraft in a climbout. I was flying No. 4 in a four-plane division. We were under CIC control and they gave us heading changes. After about the second turn, the instruments showed the wings level and climbing, and I thought I was in a 90-degree bank. Then we hit another turn in the same direction and I thought we were upside down. We continued to climb and turned in the opposite direction and the feeling disappeared."

Most Common Report

The most common and frequent situation reported in the study was the case in which the pilot thought he was in a left turn but on checking his instruments saw that he was flying straight and level.

Other vertigo situations occuring frequently were: the pilot kept having sensations that one or the other of the wings was down although the wings were really level . . . when the leader straightened out from a turn, the wingman felt he was still in a turn . . . when the pilot levelled off after a bank, he had a tendency to overbank in the opposite direction . . . and . . . pilot failure to perceive a dive.

Other reports and sensations are described in *Medical Airmanship*, edited by Col. N. D. Van Sickle, USAF, and published by D. Van Nostrand Co., Inc., copyright 1957. *See box page 32.*

One of the cases in the vertigo study fits the pattern known medically as the coriolis phenomenon. This can occur when the pilot looks down to change radio channels in a cockpit where the selector dial and controls are slightly in back of him and to one side. If, for example, the plane rolls slightly while the pilot is leaning over and looking down to change frequencies, he may experience vertigo when he straightens up and looks ahead. (The impressions are increased during letdown, and penetration turns, so if possible, set up the cockpit before beginning such maneuvers.)

Here's how one jet pilot in the study describes his experience:

"The flight was normal until I ran into the vertigo problem. I had been airborne about three-quarters of an hour. I attempted to dial in a frequency on my radio while I was in a turn. As I did my bank steepened and my gyro-horizon tumbled. When I looked up from the radio, I was disoriented. I was at 35,000 feet at the time. I tried to orient myself by visual means and by instruments. There were several thin layers of clouds in the area at the time and I was zooming in and out of them. One moment I'd be descending rapidly and the next I'd be climbing. I was losing altitude as a result, and I made up my mind that I'd eject if I went below 20,000 feet. As I passed through this altitude and still was not oriented, I ejected. I had a normal ejection and a safe landing."

A number of pilots in the study reported vertigo experiences which were primarily visual in character. These included confusing ground lights and stars, trying to join up on a star, illusory motion of lights, errors in locating lights and misjudging the position of clouds.

Sample instances are:

"I was flying in and out of the overcast and I ran into slanting layers of clouds. I lined up with the clouds as a horizon and that put me into a turn. I eliminated it by going back to the gauges."

"We were on a night radar hop . . . I was watching my instruments and looking out to find the other pilot in the clouds . . . Through the thin haze I saw the lights from a city. I thought the lights were closer and actually they were a long way off. I thought I was in a vertical bank. I checked the instruments and I was straight and level. It took several seconds to convince myself I was wrong. The instruments convinced me I was OK, but I still looked tilted on a second look at the lights."

Visual Vertigo

Though not discussed in the U. S. Naval School of Aviation Medicine study, another form of visual vertigo is flicker vertigo. (See "Light Fantastic," APPROACH, May 1956) Flickering light, particularly within a frequency range of from 4 to 20 times a second, can induce vertigo. The light source can be the rays of the sun seen through a revolving propeller; flickering light reflected from objects or from the overcast; or flickering lights on other aircraft or on the ground.

Excerpts from "Modern Airmanship" by Col. M. D. Van Sickle, USAF, Copyright 1957. Reprinted with permission of publisher, D. Van Nostrand Co., Inc.

Sensation of Climbing While Turning. In a properly banked turn, acceleration tends to force the body firmly into the seat in the same manner as when the aircraft is entering a climb or pulling out of a dive. Without visual references, an aircraft making a banked turn may be interpreted as being in a climbing attitude, and the pilot may react inappropriately by pushing forward on the control column.

Sensation of Diving While Recovering from a Turn. The positive g-forces sustained in a banked turn are reduced as the turn is completed. This reduction in pressure gives the flyer the same sensation as going into a dive and may be interpreted in this way. He may overcorrect by pulling back on the control column and cause the aircraft to stall.

Sensation of Diving Following Pull-out from a Dive. The accelerative forces on the body during the pull-out from a dive are reduced after recovery is complete. This reduction in g-forces may be falsely identified as originating from another dive.

Sensation of Opposite Tilt While Skidding. If skidding of the aircraft takes place during a turn, the body is pressed away from the direction of turning. This may be falsely perceived as a tilt in the opposite direction.

Illusions which are the result of stimulation of the visual and vestibular senses are called oculogyral illusions. These results when conflicting impulses from the eyes and the semi-circular canals are transmitted to the brain.

The Coriolis Phenomenon. This is a severe loss of equilibrium in which vertigo results. When the pilot is rotating with the aircraft and then moves his head out of the plane of rotation, there is a differential stimulation of two sets of semi-circular canals. For example, if during a spin the pilot moves his head forward or backward, an additional pair of semi-circular canals is stimulated and extreme dizziness and nausea [can be] suddenly produced. The consequence of such an unusual reaction in flight is apparent.

Sensation of Reversed Rotation. If a rotary motion persists for a short period and is then discontinued, there is a sensation of rotation in the opposite direction. This occurs in a spinning aircraft when the pilot has poor visual reference to the earth. After recovery from a spin to the left, there is a sensation of turning to the right. In attempting to correct for this, the pilot puts the aircraft back into the spin to the left. Flyers have given this illusion the sinister name of "graveyard spin."

Continued from preceding page

Visually-induced vertigo can occur as a pilot watches the receding lights of an airfield or carrier "pass" his plane's tail surfaces. As he turns his face forward again, he may experience a false sensation of excessive climb.

One particular item of visual vertigo reported by more than half the pilots in the study was the situation in which the pilot, staring at the leader's lights on a dark night, thought he saw the leader turn left when he was actually on a straight course.

Many cases of visual vertigo reported involved clouds. Thirty-seven pilots reported vertigo in partial overcast when wisps of clouds going by the aircraft confused them about position. Twenty-seven recalled coming out of a thick overcast and finding that the horizon appeared severely tilted although the plane seemed straight and level. Two pilots in the study said that while flying wingman after a series of maneuvers between two cloud layers, they flew their planes upside-down but thought they were right-side up and the lead plane was upside-down.

Haze and adverse lighting conditions obscuring the horizon can create visual vertigo situations. In areas such as Alaska where haze is aggravated by reflected light from snow-covered ground, a pilot can lose his visual frame of reference and get vertigo. This parallels the vertigo problem of the Eskimo paddling his kayak between snow fields.

Nav Confusion

In vertigo, pilots can become seriously confused regarding their direction of flight. The following is an example:

"I was at sea in an FJ-3 above the overcast with full reference to the horizon at 38,000 feet. I went into a steep dive and from 35,000 to 28,000 feet I didn't know my attitude. . . . I didn't know which way to roll to effect a recovery. I was a little shook, and when I recovered at 18,000 feet above the overcast I didn't believe the compass. I was still disoriented on instruments. I lost my sense of direction. I thought I was heading west and my real direction was east."

The following case of vertigo illustrates vertigo made worse by severe turbulence:

"I was on a routine cross-country navigation flight in an F-84E . . . I entered a thunderstorm which I had been unable to see because I was already flying instruments in a stratus layer. Everything started to get real dark and then became extremely rough. It was so violent that my head was banging the sides of the canopy and the aircraft instruments were all moving and lagging so much that I had no idea what position I was in. I came out of the thunderstorm very shortly heading almost 180 degrees from my original heading. I was so confused and shook up that I wouldn't believe my compass, horizon or anything until I had been in the smooth air at least a minute."

Length of Experience

Vertigo experiences vary greatly in duration. Forty-three incidents reported in the study were estimated to have lasted less than one minute, 14 between one and two minutes and seven between two and three minutes. Thirteen of the experiences were judged to have been 10 minutes or more in duration.

The shortest vertigo experience reported in the study was two to three seconds when the pilot thought he was in straight and level flight although he was in a 30-degree bank. The longest was of one and three-quarter hours' duration, an incident in which vertigo began when the pilot rolled out of a 30 degree bank on instruments shortly after takeoff and continued to experience vertigo until just before he landed. He reports flying the whole hop feeling that he was over on his right side. This type of experience is sometimes described as the "leans."

Cope Dope

What can a pilot do to cope with vertigo and keep it to a minimum?

The pilot's most important and most reliable method of safely getting through a vertigo situation is disciplining himself to put full confidence in his instruments. Although the vertigo may continue after straight and level flight has been established, eventually it will disappear. Admittedly it is difficult to ignore strong physical sensations and fly instruments but it has to be done. Confidence and ability in instrument flying comes from practice, practice and more practice.

To avoid vertigo, wingmen should be allowed frequent changing of position, especially when on instruments.

Proper advance flight planning on cross-country flights can minimize cockpit confusion—hunting for frequencies, intersections . . . , thereby lessening the possibility of too much head moving and thus vertigo.

The RCAF suggest two specific means to combat vertigo—(1) Talk it over with other pilots so they can profit from your experience, and (2) Get some more instrument (including Link) practice right away.

When disoriented by clouds or fog, birds ground themselves. Twirling, spinning ballet dancers counteract vertigo by selecting a fixed point of reference on which they fasten their eyes on each turn. What the Eskimo does paddling his kayak between the snowfields is, to date, an unanswered question.

But for the pilot in a vertigo situation, flying on instruments is ALWAYS the answer. This requires practice, experience and professional skill. So, in a vertigo situation, disregarding your sensations and relying completely on your flight instruments will bring you safely home.

NOTES FROM YOUR

"MY WINGMAN and I walked out to the line shack discussing the flight in general, and the darkness. He appeared nervous and seemed to dread the flight. I told him if he didn't feel like flying he shouldn't, but he stated that he would go ahead and take the next aircraft because he did not want the other pilots to think him a coward for not flying."

It was night loft bombing practice. The pilot orbited his A4D two or three times around the holding point and on receiving clearance he commenced his first run, an over the shoulder loft. This was completed normally. On the second run, the same maneuver, he made a normal delivery pull up, and radioed that he had completed his run and caged his LABS gear.

The plane's lights were then observed to descend steadily into the ground with an explosion following . . .

The deceased was average in flight ability, far above average in flight planning, theoretical background and all other aspects of flying; and was very cautious and careful. Two days before this the commanding officer had briefed the squadron, stressing that the night loft should not be attempted if a pilot did not feel equal to it.

There are several possible explanations for the fatal dive. The pilot may have become disoriented at the top of the loop as he rolled out upright and tried to divide his attention between his instruments and the very few landmarks on the ground, and thus gotten into too steep a dive to recover.

He may have been setting his LABS gear timer for the next run after rolling out and got into a dive without being aware of it.

Or he may have looked back over his shoulder as he rolled out, trying to see the flash of his hit, with the combined roll of the plane in one direction and the turning of his head in another he could have received a false sensation of motion (coriolis effect), and responded by pointing the nose down to "correct."

In any case, it seems a possibility that his mental state during the flight may have had a strong bearing on the cause of the accident and he should have heeded the warning signal of anxiety which he himself recognized and which squadron doctrine instructed him to heed.

For more on Vertigo see page 28.

Visibility Plus

DID you know that under ideal weather conditions, the bright green of your dye marker can be seen from the air with the naked eye for approximately four miles?

When seen from a plane, even at low altitude, a life raft is only a tiny dot on the ocean. The approximately 100 ft. circle of bright green water created by the dye packet makes an excellent target for searching aircraft.

The fluorescent dye powder dissolves faster in moving water than in relatively calm water. In a moderate sea, the packet is exhausted in 20 to 30 minutes and the dye ceases to be a good search target after an hour. For this reason, it is a good idea to save your dye packet until a rescue craft is known to be in the vicinity and then to disperse the dye as quickly as possible.

When tied on to the raft and dragged behind it, the dye marker gives off a trail of brilliant green which a search plane can follow. When used in surf, the dye loses its effectiveness because it is practically the same color as shoal water.

The dye marker should not be used at the same time as shark repellent. The shark repellent gives off a dark color which hides the dye.

The dye marker is also effective in snowfields.

Bareheaded

A PILOT in an F9F-6 had to eject because of dive brake difficulties and consequent loss of control of the aircraft. He ejected through the canopy at 5000 feet with the visor of his APH-5 helmet up. On hitting the wind blast, he lost his helmet and with it, his oxygen mask. The helmet had no nape strap.

When worn properly, the visor of the APH-5 helmet protects the pilot's face and eyes in the cockpit. When the pilot has to eject, the visor helps prevent loss of the helmet and gives protection from the wind blast. The helmet decreases chances of head injury on landing.

The addition of a nape strap increases the designed function of the APH-5 helmet.

Down in The Cornfield

HE PULLED the face curtain in his FJ3 at 10,000 feet. The next thing he remembers is coming to in a cornfield and being surrounded by spectators.

Without his automatic equipment, this young ensign would never have lived to tell his hairy tale to the boys at the club and the BOQ. As it was, he got off with a broken arm and dislocated

FLIGHT SURGEON....

knees. His knee injuries required operative repair.

The cause of the accident was the pilot's unfamiliarity with the aircraft. New to the squadron, he had only 11.5 hours in type. The indoctrination hop was uneventful until at approximately 20,000 feet, the aircraft went out of control. The pilot tried to get the plane under control but when he saw 10,000 feet flash by on the altimeter, he reached for the ejection curtain.

Witnesses who observed the pilot's descent said he "came down like a log." His chute was ripped and during the ejection he lost his helmet and his gloves. The lower portion of both legs of his summer flying suit were ripped away and the sole of his left shoe was almost off.

Damage to his suit and shoes was presumably caused by windblast. He ejected at an unfavorable speed in an unusual attitude without any clear attempt to position himself before ejection. The injuries to his knees indicate that a sudden windblast separated his legs and simultaneously rotated his feet outward.

Improper ejection procedure is as potentially lethal as trying to ride an aircraft down.

Helicopter Rescue

FOLLOWING landing aboard the carrier, the pilot inadvertently taxied his A4D over the port side in the vicinity of the number two elevator.

The helicopter crewman spotted the pilot in the water a few feet from the sinking aircraft. The pilot was wearing his Mark III "C" life vest, parachute and liferaft kit.

Although the rescue took only five minutes' total time, it could have been easier and faster. The pilot had trouble entering the rescue sling because of the bulk of his Mark III "C" life vest. He got into the sling improperly and came up, the sling over his head and under one arm while he held on with his other hand. In addition, he had neglected to detach his liferaft kit and as he was hoisted into the helicopter, the kit fouled on the hatch. The helicopter crewman had considerable difficulty freeing the liferaft kit and getting the pilot into the helicopter.

All pilots should realize the importance of removing their parachutes and liferaft kits before helicopter rescue.

Sandbag Trouble

A hypoxic passenger can be a hazard to the safe operation of an aircraft. Take the case of the pilot and his passenger, also a pilot, on a cross country flight in a TV-2 not too long ago.

After approximately 30 minutes' flight at varying altitudes from 26,000 to 31,000 feet, the passenger lost consciousness due to hypoxia. When the pilot became aware of his passenger's condition, he declared an emergency and attempted to land. Upon descending to an altitude of approximately 12,000 feet, the passenger regained consciousness and thinking the plane was going to crash, tried to take over the controls. With difficulty, the pilot regained the controls and made a normal landing.

On disembarking from the aircraft, the passenger appeared normal although he did not remember fighting the controls and was not clear why the landing had been made so early in the trip.

The passenger had been unconscious approximately 40 minutes.

At no time during the flight did the passenger experience any difficulty or resistance in breathing. He was unaware of any unusual odors. Up to the time he lost consciousness, he recalls no indication that the oxygen system was functioning improperly. He does not remember passing out or coming to.

The only after effects he noted were stopped-up ears, a headache which disappeared after he ate supper, and a slight pain in the left chest.

The passenger was checked out in the low pressure chamber a year ago. When instructed to remove his mask in the chamber at 30,000 feet in the hypoxia demonstration, he was unable to stay off oxygen for a full minute because of a dizzy feeling. He states that he did not feel dizzy before passing out in the TV-2 flight.

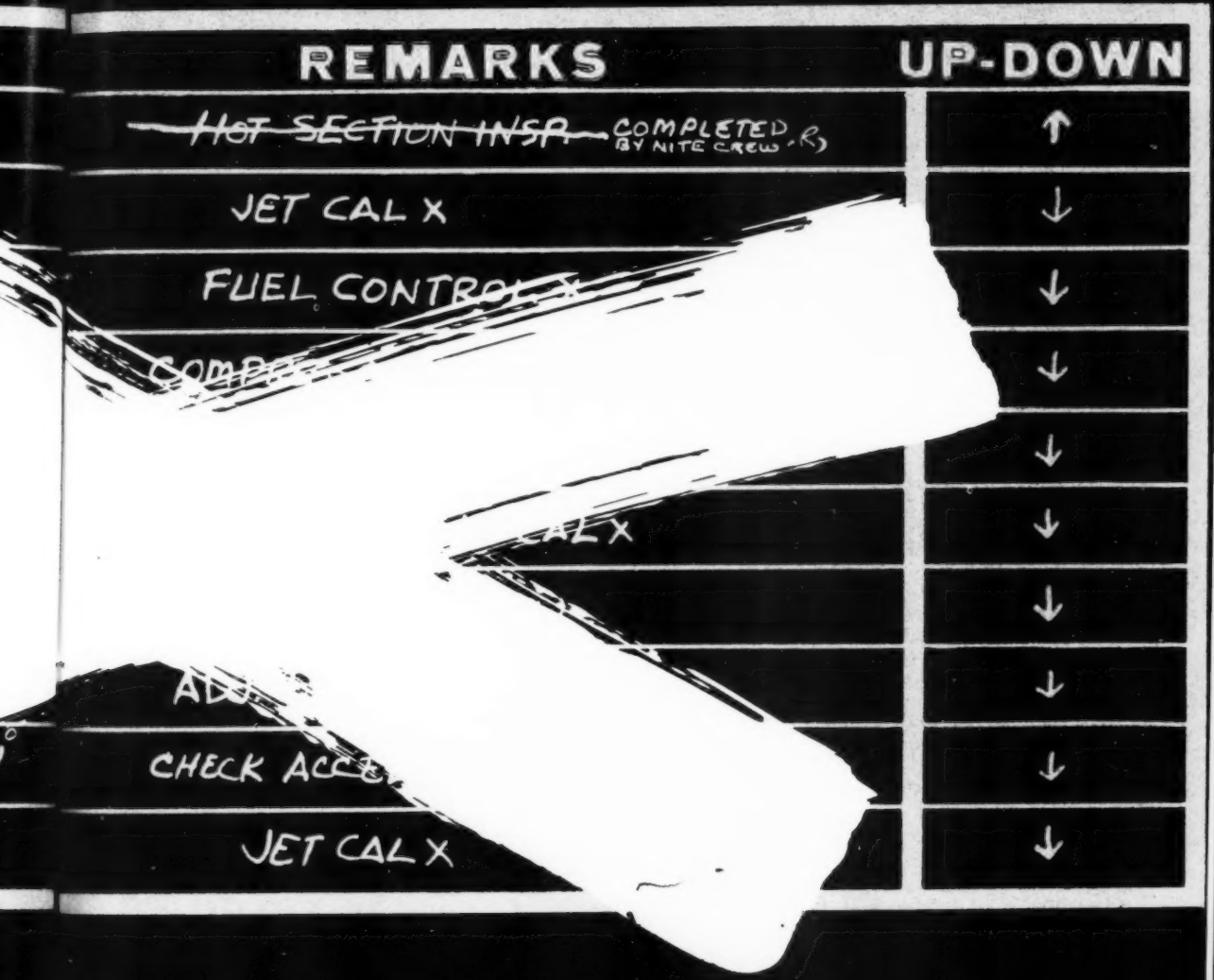
It was suspected that the cause of the passenger's trouble was a leak in the oxygen system. Investigation revealed that the disconnect tube assembly had been inadvertently bent out of position preventing its proper seating in the personal disconnect fitting. This possibly occurred during installation.

It was an emergency operation.

BUNO	DISCREPANCY
654321	H
322	FL
323	S
324	SHORT
325	TPT FLUCTUATES
326	98.6 MAX.
327	TPT WARNI
328	FLUCTUAT
329	EMERG. REE SLOW
330	OVERTEMPTED

(Reprinted with permission from General Electric Jet Service News 6 June 1958)

TUNE-UPS *cut* WRITE-UPS



THIS ARTICLE is written primarily for J47-GE-27 engines but the intent of the article is easily adaptable to other engines. We suggest you review your procedures for adjusting your engines to give top efficiency.

Stabilization of the J47-GE-27 engine is, in effect, a tune up procedure. Proper adjustment of fuel system components, acceleration time, emergency fuel system recovery time, and various other items will be individually discussed to help provide a procedure for tuning the engine for full thrust and good performance. The importance of proper engine stabilization can not be overemphasized. Under certain conditions it may save a pilot's life.

The fact that an engine will operate at 100 percent rpm and will hold TPT within limits does not necessarily mean it is operating at peak efficiency—or for that matter is even airworthy. There is more to engine stabilization than this small requirement.

Many engines are in operation today and doing a satisfactory job of developing thrust under normal conditions. These same engines might fail under abnormal conditions because of a little time

Continued from preceding page

that was not spent on proper engine stabilization. Once the engine is properly stabilized it approaches foolproof operation, and the added dependability put into it is the safety margin sometimes needed by the pilot in a pinch.

The following procedure is intended to be a step by step guide in proper engine stabilization. The information has been taken from applicable technical orders and arranged in such a form as to make this possible. In case of conflict between the information contained in technical orders and this article, the technical orders will take precedence.

Engines should be checked for stabilization during each periodic inspection, or whenever a major fuel system component has been changed. This would include a main fuel regulator, fuel control valve, or a flow divider change. Engines should be checked for stabilization after a write-up for low temperature and the write-up corrected.

With the engine operating at wide open throttle on the main system, speed should be set at 100 percent. Since the actual point of maximum efficiency of the compressor is at less than 100 percent rpm, adjusting the high speed stop for operation over 100 percent rpm will present more disadvantages than advantages. Full rated thrust can easily be obtained at 100 percent rpm if the rest of the stabilization is correctly effected.

Idle adjustment on the -27 engine installed in the F-86 aircraft should be held close to 38 percent rpm. Faster idle causes certain difficulties in handling the airplane during landing and taxiing.

"It needs a new flint."

Emergency System Check

Top speed on the emergency system should be set according to the chart in applicable technical orders. This adjustment can be made only if the correct ambient air temperature is known.

A very necessary check should be made at this time to insure that the emergency system will become non-functional when the emergency switch is in the OFF position. Several instances have been noted on operational aircraft in which the emergency regulator was in "stand by" when the switch was OFF. This is an unsafe flight condition. If a pilot is required to make a go-around during landing and throttle bursts the engine, a severe engine stall condition could result.

Since the emergency regulator solenoid is deenergized to cut in the emergency system, any open circuit, loose connection, burned out solenoid, etc., will cause the emergency system to be deactivated and be in "stand by" to the main system. This malfunction can easily be checked by the following observation.

1. Run the engine at 100 percent rpm on the main system.

2. Move emergency switch to ON. Paying close attention to the fuel flow indicator, it will be noted that the fuel flow will fall off and then climb back up to a value slightly lower than on main system operation. The fuel flow fell off because the main system failed at the time the switch was moved. The flow continued to drop until the emergency system schedule built up to an equal value with the failing main system.

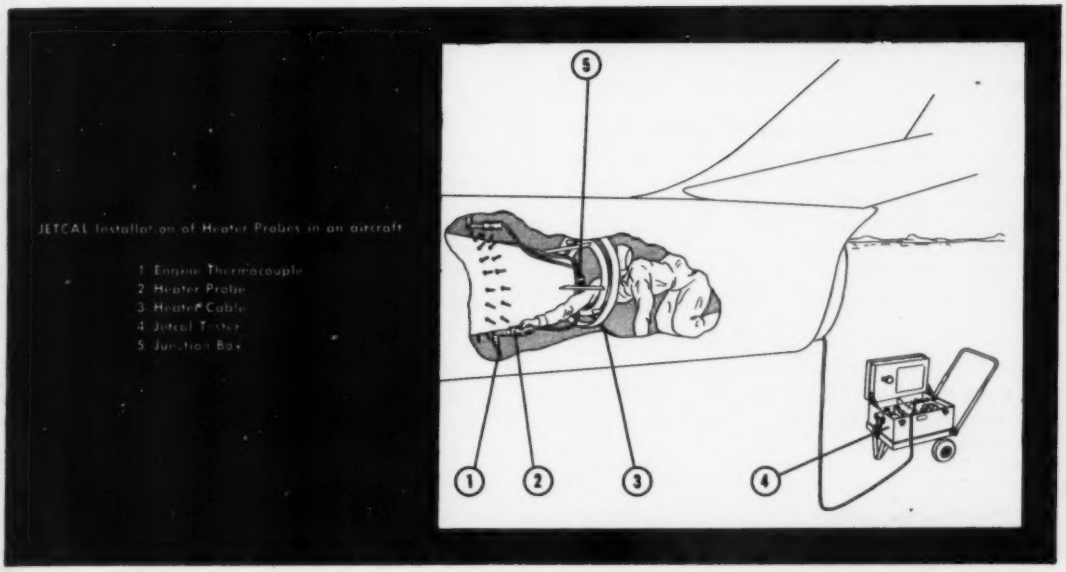
As the emergency system increased flow to the required value the gage then climbed back up to a figure slightly below normal main system operation. These indications will be observed on an engine operating normally on main system with an emergency system failed and not in "stand by."

Should the emergency system be in "stand by" when the switch is moved to the ON position, the fuel flow gage will just drop to a lower value. It will not drop below and build back up, but just drop to a lower value. This is the result of the main system failing and the fuel flow dropping only to the emergency system schedule which was in "stand by" all the time. This is not a difficult check to make, but a very important one.

After it has been determined that the emergency system will activate and deactivate properly, the recovery time should be checked.

1. Run the engine at 100 percent rpm on main system.

2. Switch to emergency system and checking with a stop watch, measure the time from the instant the switch was moved until the fuel flow recovers. This time should be 3 seconds. If the recovery time is too fast, fuel pressure or flow fluctuation may be encountered while operating on



the emergency system. If the recovery time is too slow, an unsafe flight condition is present. An example of this can be illustrated under the following circumstances.

The pilot has just left the runway during takeoff. The emergency switch is in OFF position and at this point a main system failure is encountered. The pilot, sensing the loss of RPM, switches to the emergency system. Three seconds later he is regaining power. This correct recovery time plus expert manipulation of the aircraft can avert a tragedy. If the recovery time is slow, the tragedy might not be averted.

TPT Check

The temperature indicating system should be checked by use of Jetcal test equipment per T. O. 33D4-6-18-1 (NavAer 17-15A501) to determine accuracy. Prior to making a check for acceleration time, a temperature reading at 100 percent rpm should be taken. If the engine has been in operation up to this point, a reading can be taken after a 2-minute steady 100 percent rpm run. If the engine has just been started, it is a good plan to operate it at 98 percent rpm for 4 minutes and 100 percent rpm for 3 minutes before taking a temperature reading. Since adjustment of the flow divider to obtain correct acceleration time may change exhaust gas temperature, a final temperature setting at this time is not practical; however, temperature must be between 665°C and 690°C prior to making acceleration checks.

Engines that accelerate too rapidly are susceptible to compressor stalls. Engines slow in acceleration may be low in temperature and may be subject to such a malfunction as altitude droop. On the J470GS-27 engine the main system has two controlling components for fuel flow. They are the regulator and the flow divider. The regulator is preset on a flow bench. In the flow divider, decreasing the spring tension will allow the piston to move into the large slot manifold range sooner and to a greater extent, since the spring tension is balanced against existing fuel pressure. This causes more fuel to flow sooner into the large slot and shortens the time required for the engine to reach maximum scheduled rpm during a throttle burst. Increasing spring tension will lengthen acceleration time since less fuel is introduced at a slower rate into the large slot manifold.

Stall condition may be alleviated as the decreased flow will drop burner pressure. It can be seen that acceleration time must be kept within recommended limits in order to produce a perfectly stabilized engine.

Acceleration Check

To check for proper acceleration time, the ambient air temperature and the specific gravity of the fuel used must be known. Use the chart in the applicable technical orders to determine the acceleration time for local conditions. The engine must be run for complete stabilization and expansion of the hot section. This may require several minutes at high speed depending on conditions. Running the engine 4 minutes at 98 percent

Continued from preceding page

rpm and 3 minutes at 100 percent rpm will usually do the job.

After this steady run, operate the engine at idle and make the following throttle bursts, starting in less than one minute after the engine is at idle speed. Check to make sure the emergency fuel switch is in the OFF position. From idle move the throttle to the wide open position in less than one second. At the same time the throttle is advanced, start a stop watch. Observe temperature and fuel flow.

Note—Consult T. O. 2J-J47-539 for over-temperature limitations.

When the fuel flow reaches maximum and drops off or decreases slightly, check the stop watch. The time on the watch will be the measured acceleration time in seconds. Reduce engine power slowly to idle. When engine speed has stabilized at idle speed, repeat the above operation. Make three throttle bursts and use the average time as a figure. This figure should be within one second, plus or minus of the predetermined time taken from the chart.

Best results can be obtained during cold weather operation by making the acceleration check during the warmest part of the day. In some instances during acceleration, the engine may encounter a cold stall in the 60 percent to 75 percent rpm range. Should this condition be encountered during throttle burst, retard the throttle back to idle at once. Usually it will indicate an engine with an excessively fast acceleration time.

When the flow divider is adjusted to set engine acceleration time, certain undesirable engine characteristics can be encountered.

If adjustment is made to decrease acceleration time, RPM hangup can occur. If an adjustment to increase acceleration time is made, increased RPM dropoff at altitude can occur. These characteristics usually occur when the flow divider adjustment causes the schedule to exceed the normal flow limits.

If the engine has a 14250B1, B2 or C2 regulator, RPM hangup is much less likely to occur, but the RPM dropoff can still be encountered. For adjustment of the flow divider, check your applicable technical order. Keep your acceleration time in the desired limits as described in the applicable technical order.

After the engine has been stabilized as outlined above, run the engine at 100 percent rpm on the main system long enough to stabilize temperature. Tail pipe temperature should be as shown in the charts of the applicable technical orders. If temperature is over this value, remove enough tail pipe tabbing to correct. If temperature is low, add necessary tabbing.

Sequence of Checks

To correct for a pilot write-up on temperature, check temperature indicating system first with Jetcal test equipment per T. O. 33D4-6-18-1 (NavAer 17-15A-501). Next, check acceleration time. Adjusting for correct acceleration time will have an effect on temperature and may alleviate the temperature trouble as well as correcting the acceleration time. If both the indicating system and acceleration rate are correct, then remove or install tabs in the tail pipe as needed. A rule-of-thumb method is that one square inch added area will increase TPT about 6°C.

Engines may be run with the aft section of the aircraft removed if an aft section run-up fixture is used. This fixture has provisions to secure rudder cables thus assuring brake action. A provision is also incorporated to handle hydraulic pressure so as not to damage the system. Flow divider adjustment can be made without removal of the engine when the aft section run-up fixture is used. Always park the aircraft so the tail is not up-wind during engine run-up.

It is well to note that after engines have been properly stabilized, usually 50 percent of engine malfunction write-ups disappear from the status board.

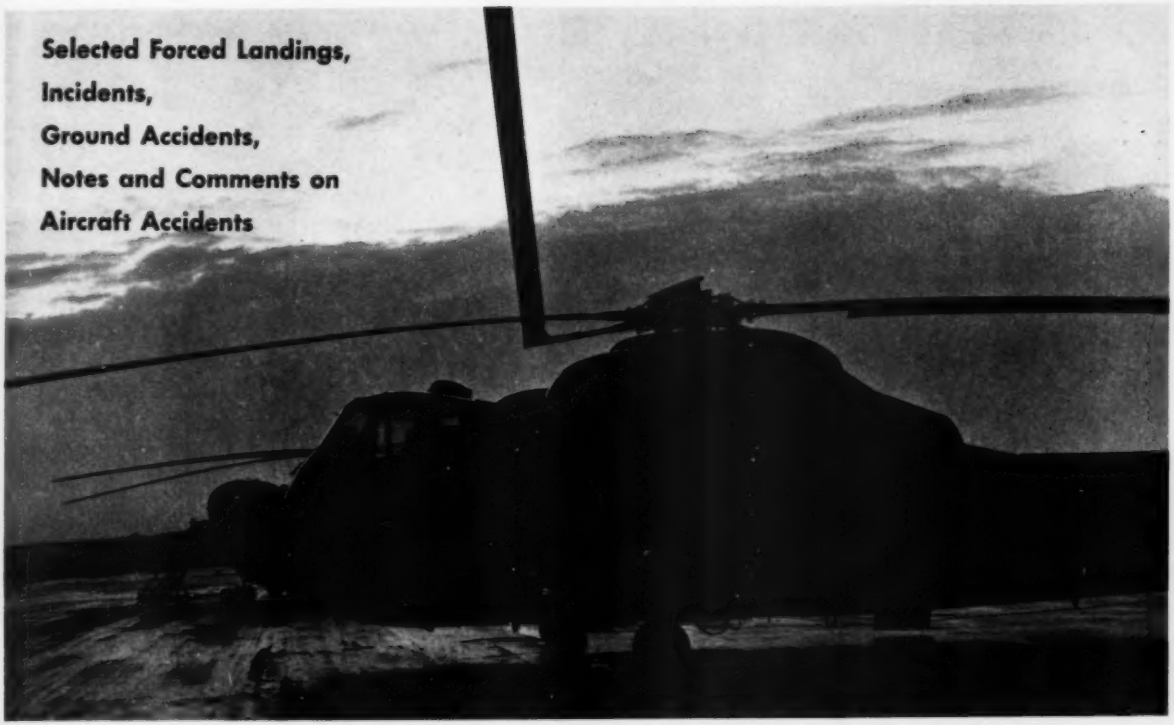
A properly stabilized engine will give your pilot the satisfaction of handling a well tuned engine, and a safety factor only you, the crew chief and your men, can give him.

Let's Get Together—

Headmouse often assists in special projects of the Naval Aviation Safety Center. For this reason he would like from you, via Anymouse Report forms or official letters, any ideas and experiences not previously reported concerning *new Murphy's Law situations.*

P.S. Just because this specific topic was mentioned, don't forget to send us a report on anything you've learned that you think will benefit others—Just address Commander, U. S. Naval Aviation Safety Center, NAS, Norfolk 11, Va.

Selected Forced Landings,
Incidents,
Ground Accidents,
Notes and Comments on
Aircraft Accidents



80-knot winds of a thunderstorm and small tornado caused damage to helicopter rotors. . .

FROM THE GROUND UP

STORM WARNING — Four HR2S helicopters were parked on the approach end of the runway when a storm struck the field. Winds estimated to have been in excess of 80 knots were encountered in a thunderstorm and small tornado. All the aircraft received damage to the main rotor blades and/or the tail rotor blades.

"There was no forecast of winds in excess of 40 knots and the precautionary measures taken by the squadron were sufficient for the forecast and the time available before the storm."

It was recommended that until modified (automatic blade fold head) blade stowage racks are made available, the following precautions and policies will be implemented:

(a) When wind velocities in excess of 50 knots are forecast blades will be folded .

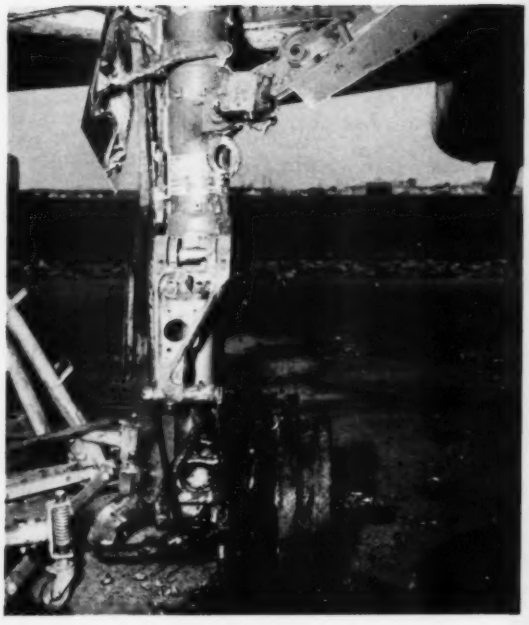
(b) Unmodified aircraft will be hangared when winds of 50 knots or more are forecast.

(c) In the event hangar space is not available to implement the above, maximum use of shelter in the expected lee of major structures will be effected. Rotor blades will be folded.

(d) Main rotor blades will be removed whenever unmodified aircraft cannot be hangared or evacuated and winds of hurricane force are expected.

It requires one hour for the average five man crew, utilizing a Bay City type crane, to remove the main rotor blades from an HR2S-1. The number of blade racks and cranes available versus the number of unmodified aircraft in the local area would determine the advance warning period required. The reporting unit said the number of unmodified aircraft assigned and in the local area is variable, no specific period can be established. However, it estimated that at least six hours would be required to place this plan into effect.

More on next page



Taxi tests following attempts to correct repeated brake discrepancies resulted in damage by fire.

TECHNICAL ASSISTANCE—Maintenance personnel requested a high speed taxi test on an FJ-3 after completion of routine work on reported discrepancy in the brake system. The pilot made an initial run at high taxi speed down the duty runway and stated that the brakes appeared to be functioning normally. He then made a high speed run downwind (left cross-wind of 15 knots) by releasing the brakes at 90% rpm, and obtaining a speed of 50-65 knots Power was reduced to idle and brakes gradually applied after 3000 ft., and with 5000 ft. remaining. The pilot states that the starboard brake went full throw and at the same time the starboard tire blew. Speed was sufficiently slow to stop the aircraft on the runway although the port tire was blown in the process. Witnesses noticed smoke and flame from the starboard wheel at about the time brakes were initially applied. The resulting fire was brought under control by the NAS crash crew, who used foam, TMB and CO_2 to extinguish the magnesium burning in the wheel.

Damage required replacement of port and starboard main landing gear struts damaged by fire and heat. Replacement of port and starboard main landing wheels and brakes. Replacement of port and starboard ammunition bay doors damaged by fire and heat. Replacement of nose landing gear door damaged by fire and heat. Replacement of starboard landing flap damaged by fire.

Investigation of previous discrepancies of this FJ-3 revealed that the starboard tire was blown on landing rollout 6 days previously. The tire was replaced and two new brake assemblies installed. On the next flight, 4 days later, the pilot reported that the port brake was dragging. A taxi test indicated satisfactory functioning of the brakes. The next day the pilot reported the starboard brake was very weak and the aircraft returned to the line with the starboard brake smoking. A complete inspection of the brake was conducted but no discrepancy was indicated. The hydraulic system was bled and maintenance personnel considered that an excessive amount of air was bled off. The brake return line filter was replaced and the aircraft put up for the taxi test which resulted in this accident.

The pilot states that on the final taxi run he was using slight left brake, to keep the aircraft lined up. Since he was taxiing with a 90 degree left crosswind this would indicate that the right brake had begun to drag or bind. Seizure then occurred when brake was applied to slow the aircraft.

The following is quoted from the first endorsement of the FLIGA, "Many aircraft accidents result from the failure of maintenance personnel to correct discrepancies when the cause is not readily apparent. When doubt exists as to the correct procedure for repair, technical assistance should be requested from the cognizant ComFAir."

VENTILATED—Preparations were being made to defuel the ZPG-2 airship for a periodic tensioning check. Both hangar doors were opened to assure maximum ventilation of the hangar in accordance with Buaer Instruction 11240.25A. The airship was off the mast with the mast parked about 8-10 feet forward of the airship. Before the defueling operation was started, the airship was observed to be bouncing excessively due to wind striking the tail and the doors were immediately ordered closed. As the southeast door directly behind the airship started closing, the airship surged forward and struck the mast causing the damage shown in the photo below.

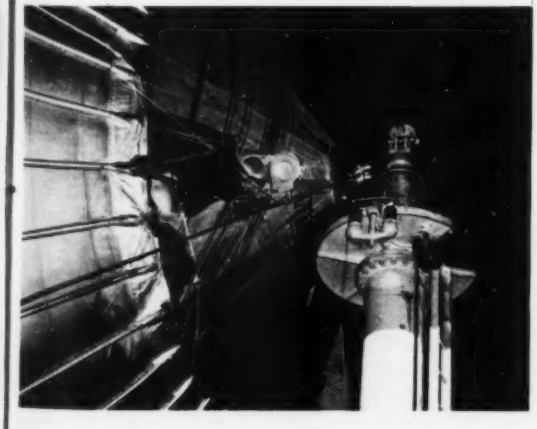
This preventable occurrence was caused solely by error in judgment of the duty officers concerned. The following are considered to be contributing factors and had any *one* been accomplished, the occurrence probably would not have happened.

a. The airship should have been masted before opening the hangar doors and allowing the wind to strike the tail of the airship.

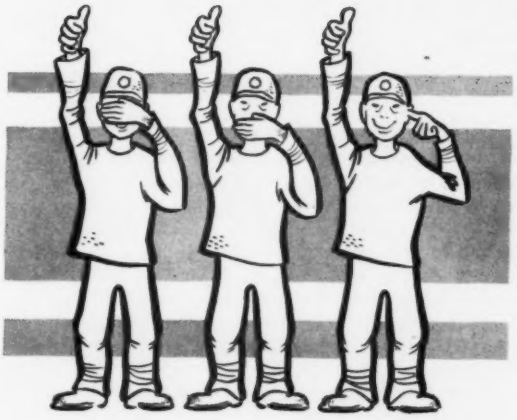
b. Surge pennants should have been attached to the main landing gear to prevent fore and aft movement of the airship.

c. The hangar doors should have been opened only far enough to provide adequate ventilation rather than fully opened for maximum airflow.

A continuous program of indoctrination of all squadron personnel on proper procedures to be followed in all phases of airship groundhandling has been followed by this command. Additional emphasis on the security of hangared airships and proper manipulation of hangar doors under various wind conditions will be vigorously pursued to prevent further occurrences of this nature.



Any one of a number of preventive actions could have prevented blimp nose from striking mooring mast.



DING HOW—While taxiing an R5D in the close quarters of the parking area of Kaitak Aerodrome, the starboard wingtip scraped the top of a small wooden shed. This occurred while the pilot received a "thumbs up" from three Chinese Nationals acting as ground directors.

Cause of Occurrence: Improper handling procedures by ground directors. All pilots have been advised to take added precautions to insure aircraft clearance at airfields where no qualified ground directors are available. If doubt exists, the aircraft will be stopped and engines secured so aircraft may be towed into the parking area.

OVERLOOKED CLUE—On a GCA after approximately 3-½ hours of flight the pilot of an S2F-1 noticed that oil pressure on the starboard engine was 40 lbs and fluctuating. In view of local weather conditions he elected to keep the engine running. Approximately 2 minutes later on GCA final the starboard engine RPM began to increase at which time the engine was feathered and a normal single engine approach and landing made without further incident.

Cause: High oil consumption on starboard engine resulting in oil starvation.

This engine had a history of high oil consumption but not to the extent experienced on this flight.

Steps have been taken to insure that unit personnel assigned responsibility to review and evaluate engines which have increased oil consumption tendencies, follow the established procedures of not assigning these aircraft for actual instrument flights.

More on next page

Continued from preceding page

TIGHT SQUEEZE—A mechanic had asked the plane captain of an AJ-2 if he was going to turn up the port engine. The plane captain replied in the negative, that he was going to turn up the starboard engine only. The mechanic then proceeded to the port wheel well doors and opened them with the manual release. (The doors were originally closed and the electrical door switch inside the aircraft remained in the CLOSED position.) He had his head up inside the wheel well investigating a reported aircraft discrepancy when the starboard engine was started. The engine-driven utility pump on the starboard engine immediately supplied 3000 p.s.i. utility pressure to the system and the port wheel well doors consequently closed on the mechanic's face and neck. As soon as his screams were heard, men rushed over and succeeded in freeing him within two minutes. The engine was secured immediately to remove the utility pressure from the system. The mechanic suffered Class C injuries.

The cause of the occurrence was due to the forgetfulness on the part of the mechanic. He was aware of the fact that the doors will immediately close when an engine is turned up with the electrical wheel well door switch in the "closed" position, and with the wheel well doors in the "open" position.

Insure that the door switch is in the "open" position prior to opening the door *manually*. As a further precaution, a clamp around the door cylinder should be used when work is to be performed in the wheel—well in order to prevent the doors from closing, should the door switch be left in the "closed" position or placed in the CLOSED position inadvertently during an engine turn-up.

SWITCHED—After preflighting and cockpit checkout on FJ-2 and having the divebrake switch in the NEUTRAL position the pilot upon signal from the plane captain commenced starting the engine. Near completion of start he felt a jar and looking aft saw the port dive brake had opened against the NC starting unit. The dive-brake switch was checked the second time and found to be in the OUT position. The plane was then shut down and secured.

The pilot believes he inadvertently moved the dive-brake switch while manipulating the throttle with both hands to effect starting of the engine.

Ground crew was instructed to park starting units as far away from plane as possible. Pilots were instructed to double-check speed brake switch in NEUTRAL and to keep hands clear while on line.

BONE CRUSHER—The pilot opened the bomb-bay doors of an A3D with the emergency handle to keep the spoiler from extending in order to facilitate bomb-bay loading. After the doors opened the gunner/navigator was installing the BB safety pins from the companionway when the pilot returned the emergency handle to neutral—thereby allowing the BB doors to close under the normal system which had remained energized closed. The gunner/navigator's thumb was caught between the door actuating arms and crushed above the knuckle.

It has been determined that the bomb-bay safety pin was being installed but not in place at the time the bomb-bay doors were actuated and consequently a bomb-bay safety pin failure did not exist.

This squadron is verbally and by written directive further indoctrinating personnel in bomb-bay door operations, systems involved, and safety precautions to be observed.

NOT CLEAR—During a 180-hour check a workstand was placed under the port wing of the P5M-1 to provide access to the flaps for inspection. Upon completion of the inspection, the mechanic entered the aircraft and lowered the flaps, which struck the upper portion of the stand. Approximately two to three feet of the inboard end of the outer flap panel was twisted and wrinkled.

The mechanic failed to determine that the flaps would clear the workstand prior to lowering them. All personnel working on aircraft should insure that the area is clear prior to operating flaps or control surfaces.

TRAPPED—An A3D was turning up in preparation for launch. While unknown to cockpit personnel, a passenger was in the bomb bay checking on personal gear stowed there. Standing on the doors, he dropped to the deck as they opened momentarily and was fatally crushed between them as they closed.

GROUND ACCIDENT MEDICINE

apc

COWL FLAPS
Dig that crazy hand-crusher

SPEED BRAKES
Down boy, DOWN!

LANDING GEAR
Egad, what knee action!

FLAPS
Scratch one flathead

BOMB-BAY DOORS
Speaking of scissors grips

ACTUATE ONLY AFTER YOU'RE **POSITIVE**
THESE COMPONENTS ARE
CLEAR!

GROUND HANDLING ACCIDENT REPORT

DURING the first four months of this year there were 57 ground accidents involving vehicles and 25 involving ground handling equipment. There were 90 accidents involving aircraft handling by motor tow or movement by personnel.

Of the vehicles involved in these accidents, 22 were starter units (in two of these the driver had no license) and five were gas and oil trucks, none of which had the assistance of a director or chock man. Other vehicle accidents included 12 stake trucks, 8 fork lifts, 1 jeep, four tractors with no intent to tow, and 5 carts under tow. Only six cases of the 57 were due to material failure or malfunction.

Ground handling equipment accounted for 25 accidents. Improper securing of aircraft caused 12 of these, and resulted in two aircraft being lost over the side. Three aircraft were damaged while being hoisted, and in one case only half the sling was used. Five aircraft fell from jacks during check due to personnel error, and four stands and one ladder damaged aircraft because of carelessness. Only two of these 25 accidents were due to material failure or malfunction.

The big one, aircraft handling which accounted for 90 accidents, included 54 mishaps during towing of aircraft, 31 while being moved by personnel, and six while taxiing.

There were 35 other accidents involving everything from high pressure air being used for low pressure tires, equipment minus safety features, to dirt, objects and men being sucked into intakes.

Twenty-one of these accidents occurred in January, 56 in February, 97 in March and 34 in April. Seventy-seven percent took place during normal working hours.

Rates involved on a percentage basis were:

E-7	00.04%
E-6	00.09%
E-5	12.00%
E-4	28.00%
Nonrated	31.00%
Civilian	00.04%
Unknown or unreported	28.83%

Forklift, left, damaging wingtip of R4D, ranks high on vehicle damage totem pole.

CASE I

currence—Aircraft struck a bird while making
level bombing run-in at 500 knots.
EMARKS—"In over 3000 bombing runs during
squadron's present deployment, this is the first
me a bird has been struck. Therefore, this is
sidered an isolated case."

CASE II

currence—Aircraft struck a bird while making
level bombing run-in at 500 knots.
EMARKS—"This is the second time an aircraft
struck a bird during a low level bombing run-
. While the presence of these birds in the target
a is considered a definite hazard, it is felt that
ere is very little a pilot can do to avoid them . . ."

CASE III

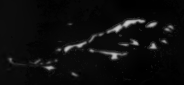
currence—Aircraft struck a bird while making
level bombing run-in at 500 knots.
EMARKS—". . . It is difficult to see birds in
ght and even more difficult to take evasive ac-
n if they are seen. All pilots have been in-
ucted to pull up and abort if birds are seen
flight path."

CASE IV, etc.

d Infinitum. . . .

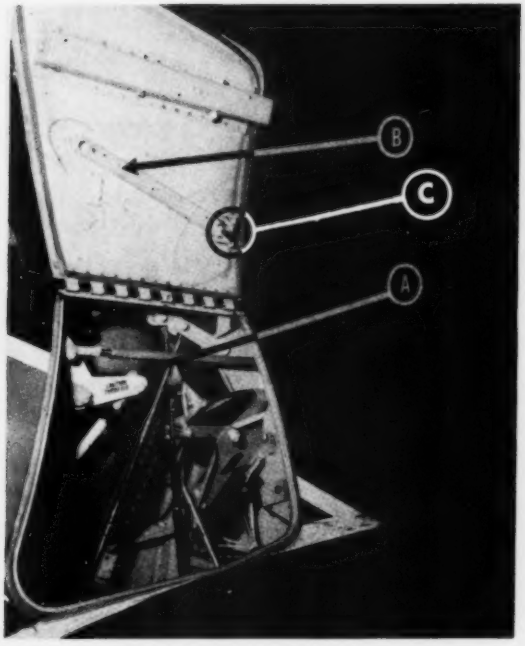
BIRD WATCHERS—While on run-in for LABS maneuver the AJD-2 aircraft apparently struck a small bird on the horizontal stabilizer. The aircraft was 200 feet above the trees. The pilot was not aware of striking the bird. Post flight inspection revealed the damage to the aircraft. Two other aircraft on this flight struck birds. REFERENCE VA-56 FLIGA SER 1-55 of 3-55.

In order to accomplish required training it is necessary to approach the target at very low altitudes. In order to avoid small birds as much as possible the squadron bombing pattern has been changed. Aircraft are now maintaining 700 feet until they have cleared the trees and then ascend to run-in altitude. Subsequent flights have indicated that this pattern is satisfactory.



MURPHY'S LAW

If an aircraft part can be installed incorrectly, someone will install it that way!



Spring C installed upside down causes door support arm B to be pulled into throttle bell crank A.

MURPHY IN F9F-8—After the pull-up following a bombing run in an F9F-8 the pilot was unable to retard the throttle below 87 percent rpm. The pilot returned to field and upon landing was able to overpower the restriction and retard the throttle to IDLE. Landing was without incident.

The support arm for the access door to the oxygen compartment on the port side of the aircraft was binding the throttle bell crank. The spring installed to pull the arm down into the retaining clip was installed UPSIDE DOWN and pulled the arm up into the throw of the throttle bell crank.

The reporting unit inspected its aircraft and 32 of 99 assigned were found to have one or both of the support arm springs installed wrong. Five of the port access door arms had gouge marks indicating that they had at some time been in contact with the throttle bell-crank.

Clipboard

Too Many Radios

HOME and portable radio receivers are often capable of transmitting as well as they receive, and unintentionally too. In the Big War unknowing radio listeners on merchant ships at sea sometimes provided U-boats with with useful bearings while tuned to the Series. Now, according to a FSF Bulletin an airline reports it has experienced interference with its VHF nav gear, traced to a passenger's portable radio, and has cautioned its cabin personnel to be on the watch for such radios in use.

VR squadrons might do well to keep this in mind.

NARTU, Norfolk adds a punch line to their private reading racks!

Sure Set-up

AIRCRAFT operating in the area of an accident are in a deadly set-up for a mid-air collision. With no planned "pattern" existing, you'll find aircraft with widely varying speeds, including helicopters, orbiting a crash site, often in opposite directions. With much attention concentrated on the crashed aircraft, the hazard of another accident in the same vicinity is increased tremendously. Pilots orbiting an accident site for a useful purpose should maintain an extremely vigilant lookout, and pilots who have no more than spectator interest should leave the area, for their own safety and that of others.

Answers to quiz, page 12

1. Declare an emergency.
2. False. You should not contact approach control until over specified holding point unless directed to do so.
3. Always—b, c, e, h, i, k. When requested—a, d, f, g, j.
4. False. You should continue the flight at the altitude(s) last assigned by ATC or the minimum instrument altitude (whichever is higher).
5. Proceed to the radio facility serving the destination airport.
6. The time ATC has specified that further clearance may be expected. Then continue the flight.
7. Last estimated arrival time you specified, or as soon as possible thereafter.
8. True.

Secondary Dangers

A SUDDEN and violent manneuver to escape a midair collision may be successful as far as collision avoidance is concerned, but it can bring about disaster of another order.

Quite recently two foreign airline aircraft were involved in a night near-miss off the coast of Spain. As the result of sudden and violent maneuvers to avoid the collision, one of the transports went out of control and crashed into the sea, killing its 14 passengers and crew of two.—*FSF Bul. 58-6*

Dodge-Em

THE pilot of a jet bomber was flying at 30,000 feet on a clear morning. He made a slow turn and was startled to see three other bombers approximately one mile away and on a collision course with him. Before he could react or alter the course of his aircraft, he shot through the formation, missing the nose of the first aircraft, flying under the second, and over the third. As he went over the third bomber, one of his engines struck the upper part of this bomber's tail and knocked it off. The pilot who flew through the formation then returned to his home base, landed, and recounted his experience. Inasmuch as no report had been received from the formation he had flown through, it was called and requested to land. When it landed it was found that the formation consisted not of three aircraft but of six. The aircraft whose tail had been hit was not significantly damaged. What is amazing is that neither the pilot, the copilot nor the observer in any of the six aircraft had seen the other bomber fly through the formation!—FSF

"It's better to be careful a thousand times than to get burned just once."

Anon

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OLD
PRO

LCDR H. R. POORMAN

F3H-2N, BAR St. Louis

While on a flight to test the operations of the fire control gear in a new aircraft, a system failure pumped the F3H's fuel overboard. LCDR Poorman observed that he would soon flame out and declared an emergency. He was at 21,000 feet over the densely populated suburbs of St. Louis, but not in a position to effect a flameout landing attempt at any of the major airfields.

The fire warning light came on as the flameout occurred. LCDR Poorman remained with the burning aircraft during the descent to 11,000 feet while gliding away from all populated areas. He finally ejected following a series of explosions which caused the controls to freeze.

By exposing himself to possible serious consequences, he assured that the aircraft's crash would not endanger personnel on the ground.

NAVCAD Edward F. SULLIVAN

TV-2, NAAS Chase Field

NAVCAD Sullivan was under the hood in the rear seat of an TV-2, flying with his instructor on a night cross-country training flight to El Paso. Just prior to crossing Salt Flat Radio, Cadet Sullivan noted a movement in the rudder pedals and felt the aircraft yaw. Unable to obtain an answer from his instructor on ICS, he popped the hood and saw the instructor slumped in the front seat. At about the same time, air-to-ground communications were lost.

Cadet Sullivan proceeded to El Paso radio, avoiding thunderstorms in the area. A break in the undercast permitted him to make a VFR letdown to the field. He determined the wind direction from ground and passed over the field, rocking his wings until cleared to land by a green light from the tower.

With the canopy frosted, Cadet Sullivan made an uneventful night landing, (his first from the rear seat) at this strange field (elevation 3936 feet) with the instructor pilot dead in the front seat.

Recognition of heads-up flying is essential to a positive program of flight safety. For this reason Approach will acknowledge certain selected individuals whose exhibited flying ability merits membership in the "Old Pro Club" of naval aviators. Commanding Officers are invited to submit nominations for selection.

Mid-air collisions, like all other accidents, don't just happen—they're caused.

They're caused by a multitude of factors, factors which sometimes cancel each other out and produce only a "near miss," and which sometimes compound to produce a tragic headline.

Many of the causes can be eliminated, by design for better visibity, wide procurement and use of modern, high-performance ground radars, delineation of off-airways training areas with suitable navigational facilities, and airborne anti-collision warning devices.

The best warning device currently available is the Being, Human, Mk 1958, w/head, swivelling. Current effort toward minimizing mid-air collisions is primarily in the area of better seeability—fluorescent paints, rotating beacons, flashing lights—all of which require a very basic participation on the part of every aviator. HE MUST BE LOOKING IF HE IS TO SEE THEM.

Long gone are the days when one could climb above 10,000 feet and relax because "there's no one else up here but me"; before the year is out the high altitudes which were once the military flyer's private domain will include high-flying commercial jet transports. For a time, they too may be lulled into the false complacency that high altitude induces.

The upper reaches of the sky are no less demanding of constant vigilance; with ever-increasing traffic in the higher regions it behooves every aviator to look out for himself by looking out for others. . .

And now turn to page 2 and read "Look Out For Me". . .